DOCUMENT RESUME

ED 282 031 CE 047 174

AUTHOR Campbell, Paul B.; And Others
TITLE Education and Labor Market Experience of Vocational Students from Three Types of Secondary Schools.
INSTITUTION Ohio State Univ., Columbus. National Center for Research in Vocational Education.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE May 87
GRANT G008620030
NOTE 129p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS *Delivery Systems; High Schools; *Institutional Characteristics; Longitudinal Studies; *Outcomes of Education; Program Effectiveness; Regional Schools; *Student Characteristics; *Vocational Education; Vocational Schools
IDENTIFIERS High School and Beyond (NCES)

ABSTRACT

Research addressed the relative effectiveness of the three types of vocational delivery systems: comprehensive, full-time vocational, and area vocational schools. Data were from the 1980 sophomore and senior cohorts of the High School and Beyond national longitudinal database. Descriptive findings regarding full-time vocational and comprehensive high schools suggested that vocational teachers often have an associate degree or less and more work experience than academic instructors; students in vocational high schools are from lower socioeconomic status/ability quartiles, are disproportionately male, and are more likely to concentrate in a vocational specialty; and comprehensive high school graduates are more likely to attend postsecondary schools. Individual-level findings of multivariate analysis indicated that verbal and mathematics scores are significantly lower among students attending area vocational schools; no reliable effect was found for school type when wages were examined; dropout rates were substantially the same; and attendance at a vocational school or area vocational school does not affect rates of postsecondary participation. Institutional aggregate results revealed slight differences: seniors in vocational schools have higher average verbal scores, dropout rates are lower in smaller schools, and no differences were found in program-related placement, mathematics scores, levels of postsecondary attendance, absenteeism, and dropout rates. Data is displayed in 33 tables. References are included. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED282031

EDUCATION AND LABOR MARKET EXPERIENCE OF VOCATIONAL STUDENTS FROM THREE TYPES OF SECONDARY SCHOOLS

Paul B. Campbell
Jack Elliot
Lawrence Hotchkiss
Suzanne Laughlin

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

CE 047 134

The National Center for Research in Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210-1090

May 1987

THE NATIONAL CENTER MISSION STATEMENT

The National Center for Research in Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning, preparation, and progression. The National Center fulfills its mission by:

- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Providing information for national planning and policy
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

FUNDING INFORMATION

Project Title:	National Center for Research in Vocational Education, Evaluation and Policy Planning
Grant Number:	G008620030
Project Number:	051BH70001O
Act under Which Funds Administered:	Carl D. Perkins Vocational Education Act, P.L. 98-524, 1984
Source of Grant:	Office of Vocational and Adult Education U.S. Department of Education Washington, D.C. 20202
Grantee:	The National Center for Research in Vocational Education The Ohio State University Columbus, Ohio 43210-1090
Executive Director:	Ray D. Ryan
Disclaimer:	The publication was prepared pursuant to a grant with the Office of Vocational and Adult Education, U.S. Department of Education. Grantees undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
Discrimination Prohibited:	Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Title I of the Education Amendments of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Therefore, the National Center for Research in Vocational Education Project, like every program or activity receiving financial assistance from the U. S. Department of Education, must be operated in compliance with these laws.

CONTENTS

LIST OF TABLES v

LIST OF FIGURES. vii

FOREWORD ix

EXECUTIVE SUMMARY. xi

CHAPTER 1. THE STUDY BACKGROUND 1
- Problem 1
- Approach 2
- Objectives. 4

CHAPTER 2. LITERATURE REVIEW. 7
- School Effectiveness. 8
- School Characteristics. 9
- School Outcomes 12

CHAPTER 3. METHODOLOGY. 15
- Data. 15
- Data Analysis 17
- Variables 19
- Dependent Variables 19
- Independent Variables 20
- Control Variables 22

CHAPTER 4. RESULTS. 25
- Facilities, Personnel, and Programs 26
- Characteristics of Students 31
- Multivariate Analysis 49

CHAPTER 5. SUMMARY AND CONCLUSIONS. 89
- Individual Results. 90
- Institutional Results 91
- Staff Interview Results 92
- Recommendations 93

APPENDIX. OPERATIONAL DEFINITIONS OF ALL CONTROL VARIABLES 95

REFERENCES 101

LIST OF TABLES

Table

1. COMPARISON OF STUDENT SUPPORT PERSONNEL AND PROGRAMS FOR VOCATIONAL AND COMPREHENSIVE SCHOOLS. 27

2. FACILITIES AVAILABLE BY SCHOOL TYPE 28

3. VOCATIONAL AND COMPREHENSIVE HIGH SCHOOLS BY REGION AND COMMUNITY TYPE. 29

4. A COMPARISON OF TEACHING STAFF CHARACTERISTICS FOR VOCATIONAL AND COMPREHENSIVE HIGH SCHOOLS 30

5. SPECIALTY BY RACE/ETHNICITY AND GENDER FOR EACH TYPE OF DELIVERY SYSTEM--SOPHOMORES. 32

6. SPECIALTY BY CURRICULUM PATTERN FOR EACH TYPE OF DELIVERY SYSTEM--SOPHOMORES. 34

7. SOCIOECONOMIC STATUS BY SPECIALTY FOR EACH TYPE OF DELIVERY SYSTEM--SOPHOMORES. 35

8. SOCIOECONOMIC STATUS BY ACADEMIC ABILITY FOR VOCATIONAL AND COMPREHENSIVE HIGH SCHOOLS--SOPHOMORES 37

9. SOCIOECONOMIC STATUS BY ACADEMIC ABILITY FOR VOCATIONAL AND COMPREHENSIVE HIGH SCHOOLS--SENIORS. 38

10. SOCIOECONOMIC STATUS BY ACADEMIC ABILITY FOR EACH TYPE OF DELIVERY SYSTEM--SOPHOMORES. 39

11. SOCIOECONOMIC STATUS BY RACE/ETHNICITY AND GENDER FOR EACH TYPE OF DELIVERY SYSTEM--SOPHOMORES. 40

12. SOCIOECONOMIC STATUS BY RACE/ETHNICITY AND GENDER FOR EACH TYPE OF DELIVERY SYSTEM--SENIORS 41

13. RACE/ETHNICITY AND GENDER BY CURRICULUM PATTERN FOR EACH TYPE OF DELIVERY SYSTEM--SOPHOMORES. 43

14. PRESENT STATUS OF STUDENTS FROM EACH TYPE OF DELIVERY SYSTEM BY RACE/ETHNICITY AND GENDER--SOPHOMORES. 44

15. PRESENT STATUS OF STUDENTS FROM EACH TYPE OF DELIVERY SYSTEM BY RACE/ETHNICITY AND GENDER--SENIORS 46

16. AVERAGE HOURS AND WAGES FOR CURRENT/MOST RECENT JOB FOR EACH TYPE OF DELIVERY SYSTEM BY RACE/ ETHNICITY AND GENDER--SOPHOMORES. 48

17. AVERAGE HOURS AND WAGES FOR CURRENT/MOST RECENT JOB FOR EACH TYPE OF DELIVERY SYSTEM BY RACE/ ETHNICITY AND GENDER--SENIORS 50

18. FACTORS INFLUENCING HOURLY AND MONTHLY WAGES--INDIVIDUALS--SOPHOMORES. 52

19. FACTORS INFLUENCING HOURLY AND MONTHLY WAGES--INDIVIDUALS--SENIORS 54

20. FACTORS INFLUENCING ATTENDANCE AT POSTSECONDARY INSTITUTIONS - INDIVIDUALS. 57

21. FACTORS INFLUENCING ATTENDANCE AT POSTSECONDARY INSTITUTIONS--INDIVIDUALS--PROBIT ANALYSIS. 60

22. FACTORS INFLUENCING 12TH GRADE VERBAL SCORES--INDIVIDUALS 62

23. FACTORS INFLUENCING 12TH GRADE MATH SCORES--INDIVIDUALS 64

24. FACTORS AFFECTING NON-ILLNESS ABSENTEEISM--INDIVIDUALS. 67

25. FACTORS INFLUENCING DROPPING OUT - INDIVIDUALS--SOPHOMORES 69

26. FACTORS INSLUENCING DROPPING OUT - INDIVIDUALS--SOPHOMORES--PROBIT ANALYSIS. 71

27. FACTORS INFLUENCING VOCATIONAL PROGRAM-RELATED PLACEMENT--INSTITUTIONS--SOPHOMORES 74

28. FACTORS INFLUENCING 12TH GRADE VERBAL SCORES--INSTITUTIONS. 76

29. FACTORS INFLUENCING 12TH GRADE MATH SCORES--INSTITUTIONS. 78

30. FACTORS AFFECTING POSTSECONDARY ATTENDANCE--INSTITUTIONS. 80

31. FACTORS AFFECTING ATTENDANCE RATES--INSITITUIONS. . . 82

32. FACTORS INFLUENCING DROPOUT RATES--INSTITUTIONS . . . 84

33. AVERAGE DIFFERENCE IN TEACHER AND STUDENT ATTITUDE AMONG CLASSROOM TYPES. 87

LIST OF FIGURES

Figure

1 Conceptual framework for examining institutional effects 3

FOREWORD

Evaluative requirements mandated by the passage of the Carl D. Perkins Act of 1984 provided the impetus for this research project to examine institutional characteristics of secondary schools and their effects on the students who attend them. Relatively little research has been conducted in this field, especially in the specific area of secondary vocational education delivery systems. This research considered the educational and labor market experiences of graduates from full-time vocational, comprehensive, and area vocational schools. Educational experiences included scores of basic achievement tests administered during high school, dropout rates, and levels of participation in higher education. Hours worked and hourly and monthly wages earned after graduation were examined as indicators of labor market experiences.

Data from the High School and Beyond longitudinal survey were the primary source of information for this project. Findings presented here pertain only to the public schools. The first follow-up survey in 1982 included a sample of 18,000 of the original sophomores (now seniors) for which high school transcript data was obtained. The second follow-up survey was conducted in 1984 with a sample of 12,199 members of the original senior cohort and 15,000 of the original sophomores, selected from those who had participated in the transcript survey in 1982.

The results of interviews with National Center staff members who recently participated in on-site observations in 118 high schools randomly selected throughout the country, provided an additional source of information for this report. This information, of a more qualitative nature, is intended to enrich the HS&B data and "fill in" areas where the quantitative data is lacking.

The final report for this research is intended for use by researchers in the field of vocational education. An executive summary highlighting the project findings is directed toward administrators of vocational education delivery systems and policymakers as well.

This report was prepared in the Evaluation and Policy Division of the National Center for Research in Vocational Education under the direction of N. L. McCaslin, Associate Director. Paul B. Campbell, Senior Research Specialist, served as the project director. We would like to express our appreciation to Karl Alexander, Professor and Chair in the Sociology Department at Johns Hopkins University, for his thoughtful insight and helpful suggestions regarding development of the overall project design and use of methodological approaches. In addition, we wish to thank Research Specialist Lawrence Hotchkiss, Program Assistants Mary Beth Dauner and Suzanne Laughlin, and Graduate Research Associates Scott Martin and Jack Elliot for their work in preparing

this report. Also, four anonymous reviewers provided insightful comments and suggestions. Our thanks to our computer programmers Rodney Ferryman, Clarence Moultrie, and Tony Ershadi, whose capable efforts made the statistical analyses possible. For their continued effort and patience in preparing this report we thank typists Mary J. Zuber and Cathy Jones. Editing for this report was ably provided by Judy Balogh.

Ray Ryan
Executive Director
National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

This research addresses the relative effectiveness of the substantial investment in alternative facilities and organizations for providing secondary vocational education. It is based upon data from the 1980 sophomore and senior cohorts of the High School and Beyond national longitudinal database. The study is organized around the following three objectives:

- To describe the characteristics of full-time vocational and comprehensive high schools. (Descriptive information was not available for area vocational schools.)
- To examine the basic academic skills, postsecondary educational participation, and labor market outcomes of individual students from all three school types; comprehensive, full-time vocational, and area vocational schools.
- To examine educational and labor market outcomes on an institutional level using institutional averages.

Within the limits of available data, this research presents a picture of the functioning of the three types of vocational delivery systems.* The results are both descriptive and analytic. Where data are available, the types of schools are described in terms of staff, program, and students. Then the consequences of these and other possible differences are analyzed. Descriptive findings suggest the following:

- Teachers who teach vocational subjects often have an associate degree or less and more accumulated work experience than academic instructors.
- Students enrolled in vocational high schools tend to come from the lower socioeconomic status/ability quartiles, are disproportionately male, and are more likely to concentrate in a vocational specialty than are comprehensive high school vocational students.
- Comprehensive high school graduates (both vocational and nonvocational) are more likely to attend postsecondary schools than the graduates of full-time vocational schools.

---

*The term delivery system is intended to mean the provision of a learning environment that demands engagement of the student. It includes teaching, resource materials, and curricular goals. It is not intended to convey the transfer of knowledge as a commodity.

- Vocational graduates, regardless of school type, tend to work more hours per week and exhibit lower levels of unemployment than nonvocational graduates.

- A slight hourly wage advantage for vocational students, from both comprehensive and vocational high schools, was observed in the data for the senior cohort.

Multivariate analyses, permitting comparisons among similar persons through the use of control variables, were conducted at the individual and institutional levels. An examination of individual-level findings reveals the following when students are compared with others like themselves in socioeconomic status, ability, residence, and other characteristics.

- Verbal scores (a compilation of three scores of language arts tests administered at the time of the survey) do not differ among students who attend either a comprehensive or a vocational high school, but they are significantly lower among those attending area vocational schools. Math scores also are lower among those who attend the area vocational schools; however, senior math scores are higher for those who attend a full-time vocational high school.

- Seniors attending an area vocational school were found to be significantly more likely to miss school for reasons other than illness.

- No reliable effect was found for school type when hourly and monthly wages were examined. However, the vocational high school graduate's wages averaged slightly higher than those of the graduates of the other two types of schools.

- Dropout rates were substantially the same for all three types of schools.

- When characteristics such as SES, ability, and residence are controlled, attendance at a vocational school or an area vocational school does not affect rates of postsecondary participation.

Institutional aggregate results reveal slight differences among school types. They include the following:

- Average verbal scores are higher among seniors who attended a vocational school when compared with the other types.

- Average dropout rates are lower in the smaller schools.

- Examination of program-related placement, math scores, levels of postsecondary attendance, absenteeism, and drop-out rates revealed no differences among school types, when other characteristics are controlled.

The following policy considerations are recommended as a result of this study:

- The present system of three primary delivery types should be continued because there is already a considerable investment in each of them and there is no clear advantage or disadvantage for any. It appears that each is serving a somewhat different clientele. Unless the economies of an intended change recover the investment in a relatively short time period, none are justified by the present evidence.

- The disquieting suggestion that the area vocational schools may be slightly less effective in instruction in language and math is partially offset by the evidence that their students are more highly motivated by their classes. It may also be true that students who attend area vocational schools are initially less able in these areas than their contemporaries in the comprehensive and full-time vocational schools. This suggests that policy-makers should establish incentives that would capitalize on the observed motivation to improve on the acquisition of academic skills.

- Incentives for increasing the academic training of vocational teachers seem worth exploring. Many students do not arrive at the vocational class with the requisite basic skills. Academic instruction has been previously unsuccessful. Reinforcement of these skills in the vocational classroom seems necessary. Vocational teachers need to be prepared to carry out this reinforcement.

- Further study of the causes of lower attendance at the area vocational schools should be encouraged. Is it a function of the disrupted school day through the increased travel, a characteristic of the students who attend such schools that is not accounted for in the present analyses, or some other problem in need of correction?

The results of this study point conclusively to the pressing need to collect high-quality data, national in scope, that will accurately describe not only secondary school education in the United States, but especially the vocational component. Such a data collection effort would be well worth the relatively small expense involved when one considers the enormity of the vocational education enterprise ($9 billion and 10 million students) and the potentially harmful impact of decisions based on inaccurate information. Over 2,000 area vocational schools, serving many thousands of vocational students, are not identified or described in presently available data. The longitudinal data collections currently being initiated at the Federal level, and studies based upon them, will be seriously flawed if they fail to include more complete information on secondary vocational institutions and their students.

CHAPTER 1

THE STUDY BACKGROUND

Problem

Although vocational educators have debated the merits of comprehensive high schools versus vocational schools, little empirical examination of various vocational delivery systems has occurred. Recent research has concentrated upon examining vocational education in relationship to general and academic education within comprehensive high schools (Campbell, Gardner, and Seitz 1982; Gelb 1979; and Kolstad 1979). This focus upon comprehensive high schools has not, in general, included examination of high schools that specialize in vocational education. Beyond the study of vocational education systems and facilities conducted by the U.S. Department of Health, Education and Welfare (1978), little systematic information has been recorded about the characteristics of institutions that offer vocational education nationwide.* David (1983) concluded after conducting a national study of vocational education that the influence of the organizational attributes of school institutions upon the quality of vocational education is largely an unexamined question.

There is a strong mandate for examining the institutional characteristics of high schools that offer vocational education programs. The Carl D. Perkins Vocational Education Act of 1984 requires that an assessment be conducted of the institutional characteristics that impact upon the preparation of youth for employment. To date, the extent to which various vocational delivery systems have influenced successful labor market outcomes has not been determined. Nor has the influence of these different kinds of schools upon participation in postsecondary education been examined. Finally, the effects of the different institutional types upon general high school education expectations have not been adequately examined. Preliminary work (Bragg et al. 1986) has suggested that there are few outcome differences. This study extends that preliminary work to provide information on the degree to which various delivery systems effectively address the employment and educational needs of a diverse student population. It informs policymakers about these issues as they try to balance student opportunity and available resources. The outcomes of such a research effort can be used to plan future delivery systems for

*For a review, see Taylor, Rosen, and Pratzner (1982).

vocational education in ways that will better serve the diverse secondary student population.

Approach

First, the research examines the feasibility of expanding the classification of delivery systems beyond the comprehensive and vocational high school dichotomy. This determination is based upon the availability of data in the High School and Beyond (HS&B) database such as the number of vocational programs and the mix of academic, general, and vocational courses offered within or external to the institutions. Next, beyond the classification of delivery systems, the research describes institutional characteristics of delivery systems in terms of program information, student information, and staff information. These are the organizational attributes identified in The Vocational Education Study (National Institute of Education 1981) as requiring further research.

Furthermore, the project focuses upon delivery systems as they relate to both institutional and individual student outcomes. The outcomes are important areas that have historically provided evidence of program effectiveness: job placement and wages, completion of high school rather than dropping out, and participation in postsecondary education.

Framework

The conceptual framework for this research evolves from previous research that describes vocational delivery systems (U.S. Department of Health, Education and Welfare 1978; Sherman 1983; National Center for Education Statistics 1981; and Evans 1981) and their effectiveness (Benson and Hoachlander 1981; Boyer 1983; Goodlad 1984; Grasso and Shea 1979; Meyer 1981; and National Commission for Employment Policy 1981). The school effectiveness and program improvement literature contributed evidence of key characteristics of secondary schools as well (Clark, Lotto, and Astuto 1984; MacKenzie 1983; and Purkey and Smith 1982).

Figure 1 presents a tentative framework for the research. This framework grows out of earlier work by Campbell, Gardner, and Seitz (1982); Campbell and Basinger (1985); and work in progress by other National Center researchers. The figure is tentative in its present form because, although it is constructed to show a sequence of potential influences and the role of delivery systems among them, there are points in the diagram where simultaneity is a distinct possibility. For example, do the goals of the institution determine its type, or, as the figure shows, does the type of institution--comprehensive, vocational, or area vo-tech--determine the goals? However, the figure does show the network of forces through which the influence of the delivery system must be understood. It also calls attention to the differences

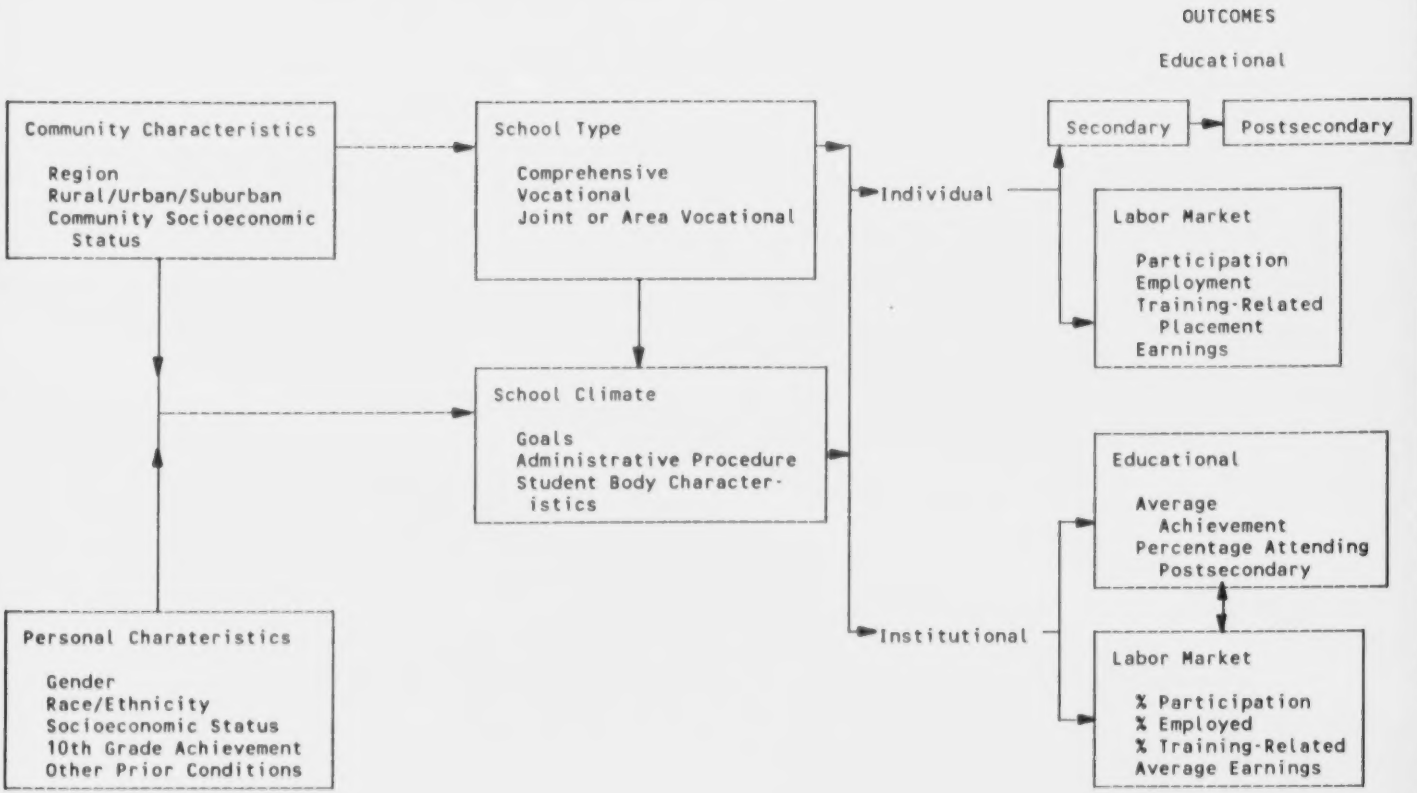

Figure 1. Conceptual framework for examining institutional effects

in outcomes, as operationally defined, for individuals and for institutions.

In keeping with human capital theory, this framework assumes that individuals invest in education. It also assumes that the influences of significant others, such as family members, will condition the investment. This position is, of course, consistent with status attainment theory. Finally, this framework assumes that the institutions themselves are shaped in part by those who participate in them as well as those who manage them--an aspect of organizational theory.

Objectives

The study was organized around a set of procedural objectives. They are limited to those that may be addressed by the available data and, therefore, do not reflect all of the relationships implied in figure 1. The objectives and related research questions for this project are as follows:

- Objective 1--To describe the characteristics of comprehensive and vocational high schools in terms of program, staff, and students that may have an effect on institutional outcomes. (Descriptive information was not available for the area vocational schools.)
  - --What is the pattern of program operation/management in terms of use of facilities and support services?
  - --How can the program be described in terms of curriculum, educational resources, and student selection of specialties?
  - --What is the average achievement level?
  - --What are the staff qualifications and rates of participation in professional development?
- Objective 2--To examine the positive and negative labor market and educational (basic and postsecondary) outcomes for students as a function of the type of school they attended.
  - --What are the associations between institutional characteristics and labor market outcomes for individual students when student characteristics are controlled?
  - --What are the associations between institutional characteristics and basic general education for individual students when student characteristics are controlled?
  - --What are the associations between institutional characteristics and postsecondary education for individual students when student characteristics are controlled?

- o Objective 3--To examine the effects of the differences between comprehensive and vocational high schools on institutional outcomes. These outcomes include consequences such as greater or lesser rates of school completion.

  --What are the associations between institutional characteristics and labor market outcomes such as rates of training-related placement?

  --What are the associations between institutional characteristics and educational outcomes such as average achievement in basic general education and proportion of students in postsecondary education?

  --What are the associations between institutional characteristics, dropout rates, and attendance rates?

These objectives were approached and answers to the questions were sought through the procedures described in more detail in chapter 3. In addition to the analysis of longitudinal data described in that chapter, site visits to different types of schools were also a part of the project. This information was used as interpretive material to supplement the longitudinal analysis.

Chapter 2 reviews the relevant literature on delivery systems. Chapter 3, as indicated above, describes the methodology. Chapter 4 presents the findings, organized around the objectives and questions. A summary and the implications for policy comprise the final chapter.

CHAPTER 2

LITERATURE REVIEW

This study examines the three most common types of public delivery systems secondary students attend in order to receive their vocational education. As detailed in chapter 3, the three types of schools are comprehensive high schools, vocational high schools, and area vocational centers. Although many studies have compared public schools with private schools and vocational curriculum with academic and general curricula, little empirical data have been collected comparing the effectiveness of the different methods of offering vocational education. The effectiveness of the various delivery systems is assessed by the labor market and educational outcomes attained by students. Studying the delivery of vocational education programs is warranted because of its effect upon the individual and society. Of the 15 million secondary students in the United States, approximately 3 million are enrolled in occupationally specific courses and about 10 million take at least 1 vocational course (Swanson 1982). Quality vocational education is essential to meet the individuals' needs for job competency and financial security as well as society's demands for placing skilled workers on the job.

A great deal of research has focused on the relative advantages for vocational versus academic and general graduates in the labor market. Findings from these studies have produced mixed results. Mertens et al. (1980) reviewed a number of studies that showed no significant differences in earnings between vocational and nonvocational graduates. However, a number of other studies reviewed by Mertens et al. (1980) indicated initial earnings advantages for vocational graduates. Yet, frequently these earnings advantages disappeared over time. Similar conclusions were drawn by Wiley and Harnischfeger (1980), Meyer and Wise (1979), and Conroy (1979). These researchers used the National Longitudinal Study of the High School Class of 1972 database. Other research has focused on the goals of programs and their effect upon employment (e.g., Ekstrom, Freeberg, and Rock 1987). Still other researchers have studied organizational effects of employing institutions upon employees (e.g., Davis-Blake 1986; Breci 1986).

Further research has indicated that intensity of enrollment in vocational education, specialization in specific vocational service areas, and training-related job placement following graduation have influenced labor market outcomes. These findings

have revealed that intensive enrollment in vocational education has been related to increased wage rates when vocational graduates have been employed later in jobs related to their training (Campbell and Basinger 1985; Rumberger and Daymont 1984).

Certainly, as findings from previous research have revealed, determining the impact of vocational education programs has been difficult, especially in comparison with academic and general education programs. Some differential effects of vocational education on labor market outcomes have been found among different types of schools (Bragg et al. 1986). For this reason, more information is needed describing the different types of vocational delivery systems and their differential effects on student outcomes. These outcomes, both labor market and educational, serve as indicators of the quality of the different delivery systems.

The difficulty of comparing the quality of vocational education in various schools should not be underestimated. This difficulty may be the reason little attention has been given to the relative effectiveness of the alternative delivery systems. Benson (1982) states that although it would be useful to compare vocational education systems on a quantitative basis, such an exercise would be complicated. He indicates that using outcome data to assess delivery system quality may not be entirely accurate and that controlling for student characteristics and local labor market conditions can be difficult. Another factor that adds to the difficulty of research in this area is the diversity of school type even within one of the three major classifications used in this study. This research investigates the delivery of vocational education at the national level. However, fiscal policies and procedures of secondary delivery systems of vocational education are carried out by state and local educational agencies. Federal policy provides a guide, but not a mandate, for the administration of education at state and local levels. As a result, the type of delivery system, even though categorized as comprehensive, vocational, or area vocational center for the purpose of this study, may vary according to the state and locality. Federal guidelines, such as assuring access for handicapped students, do tend to ensure that there are some similarities in delivery systems across the nation.

School Effectiveness

There are alternative ways of assessing the effectiveness of the delivery of vocational education. This study attempts to focus on the educational and labor market outcomes of students participating in the various delivery systems. These outcomes can be seen as desirable effects of successful vocational education and thus serve as indicators of effectiveness. Only a few studies have attempted to examine effectiveness in this way and these will be reviewed below.

As discussed in the previous section, Benson (1982) addresses the difficulty of comparing educational institutions on the basis of outcomes. He suggests an alternative approach to the problem. First, a description of the attributes of high-quality schools must be generated. In Benson's case, these attributes were derived from what was seen as high-quality programs in the Project on National Vocational Education Resources conducted for the National Institute of Education. Then a decision must be made regarding the extent to which each of the vocational delivery systems corresponds to this description of high-quality schools. Those that correspond most closely would be seen as providing effective vocational education. This study also attempts to use school characteristics as a determinant of effectiveness.

School Characteristics

A wide range of indicators has been determined in regard to identifying effective secondary schools. Campbell and Panzano (1985) postulated characteristics of high-quality vocational programs including adequacy of school facilities; competency and attitudes of teachers; attitudes and behaviors of secondary school students; amount of teacher, student, and material interaction; and degree to which students utilized the instructional process. In addition to these characteristics, Clark, Lotto, and Astuto (1984) indicated that effective schools are characterized by high levels of teacher expectations for students, supportive and orderly climates, and efficient uses of classroom time. Overall, Clark, Lotto, and Astuto (1984) found that people rather than facilities or equipment make the greatest difference in the effectiveness of schools. Finally, other dimensions of effective schools as identified by MacKenzie (1983) included goal-focused activities, inservice staff training, total staff involvement with school improvement, continuous evaluation and feedback, and schoolwide emphasis on basic and high-order skills.

The question of where and when vocational preparation best occurs in order to meet these quality components will be explored in this report. As the literature is reviewed with respect to the different delivery systems, it should be noted that there is varying quality within similar types of vocational systems. Benson and Hoachlander (1981) found, even within one type of delivery system, some vocational education programs were poorly equipped and disorganized whereas others provided superior vocational programs.

Comprehensive High Schools

There are approximately 24,000 high schools in the United States that offer both vocational and nonvocational courses. Although all of these schools provide at least 1 course that can

be called vocational, only 6,000 of them offer 5 or more vocational courses. It is these schools (25 percent of the total) that are labeled "comprehensive" (Swanson 1982). Although the comprehensive high school offers occupationally specific as well as more academically oriented courses to the secondary student, the effectiveness of vocational education when delivered in this setting is often debated.

There is surprisingly little support for the benefits of delivering vocational education in comprehensive high schools as opposed to vocational or area-vocational centers. Evans (1982) provides an exception with a plea to keep vocational education offered within the comprehensive high school. He does not argue that comprehensive high schools are superior to the other two types of delivery systems. He simply feels that to provide adequate career opportunities to all secondary students, vocational education must be offered in comprehensive high schools, the only type of secondary school universally available.

A study on the quality of facilities for the three types of delivery systems was conducted by the U.S. Department of Health, Education and Welfare (1978). The study revealed that vocational high schools were usually located in urban areas, whereas comprehensive high schools and area vocational centers were usually located in suburban and rural areas. The physical condition of institutions located in urban, as opposed to suburban or rural, areas did vary. It was found that vocational high schools located in central cities needed a great deal of maintenance and repair. Over 60 percent of vocational institutions in large cities were described as needing repair or replacement, whereas less than 40 percent of those in suburban or rural areas were described in this way.

Vocational/Area Vocational Schools

Relative to comprehensive schools, there has been a great deal of support for the superiority of vocational and area vocational schools. Benson and Hoachlander (1981) made site visits to schools in seven large cities and came to the conclusion that specialized schools such as vocational high schools and area vocational centers offered vocational education programs of generally higher quality than those of comprehensive high schools. This conclusion was based on Benson's (1982) approach to determining school quality that was mentioned earlier in this chapter. Those attributes that characterize quality vocational education were enumerated. The attributes (Benson and Hoachlander 1981; Benson 1982) of quality programs in vocational education consist of the following: comprehensiveness and depth of instruction; experience of instructional staff; closeness to industry; availability of up-to-date equipment; and flexibility in responding to local labor market demands.

Specialized vocational schools are judged to be of higher quality than comprehensive high schools because they are more apt to be characterized by the above qualities. In terms of depth of instruction, Benson (1982) points out that there are too few vocational students in most comprehensive high schools to justify offering a wide variety of advanced vocational courses. To the extent that this occurs, sufficient depth of programming is sacrificed in comprehensive high schools. He also believes that many comprehensive high school principals may inadvertently play a role in downgrading the quality of vocational instruction. Most principals have an academically oriented background and may place priority in ensuring the quality of the college preparatory program at the expense of the vocational curriculum. According to Benson, another factor that may influence principals' decisions in favor of the academic curriculum is pressure from parents in the community. The more articulate, impressive, and powerful parents, with whom the principal comes in contact most frequently, are more apt to want their children to receive a quality academic, as opposed to vocational, education.

Benson and Hoachlander (1981) report that specialized vocational institutions are able to employ more experienced staff. Vocational and area vocational high schools are able to pay higher salaries, are more likely to hire additional part-time instructors when necessary, and have more liberty in dismissing instructors whose expertise is in an area no longer required by the local labor market. Despite his sentiments in favor of the comprehensive school, Evans (1982) seems willing to admit that teachers and administrators in specialized vocational schools are generally paid more and have more recent occupational experience than staff in comprehensive schools. Goodlad's (1984) extensive study of the comprehensive high school also addresses the role of vocational education in the high school. He believes that it should be an integral part of every student's education.

It has also been demonstrated that comprehensive schools are less apt to establish close contacts with industry. Without advanced courses in vocational education, it is obvious that it will be difficult for students in comprehensive schools to establish the necessary contacts in the job market. In addition to, or possibly because of, more advanced vocational courses, Lewin-Epstein (1981) found that a greater portion of vocational education students work consistently and longer hours than do students in general curricula. It has been suggested that such labor market contacts may be more important in achieving positive labor market outcomes than training in specific skill areas (Peterson and Rabe 1981).

The guidance counselors in the comprehensive high schools also tend to have an adverse effect upon the contact between vocational students and potential employers (Benson 1982). Counselors often become preoccupied in assisting academic students to

prepare for college admission and thus lack the time to spend with vocational students. In addition, counselors' backgrounds are more academic in nature, and, as a result, they are generally less familiar with the world of work and have fewer contacts with employers of vocational students.

Weisberg (1983) points out that all programs have difficulty keeping pace with equipment and technological changes, but the problem is particularly severe for the comprehensive high school. Although Evans (1982) expresses the need for the comprehensive high school, he does recognize that equipment is more specialized and up to date in the vocational and area vocational schools. Benson (1982) found that in terms of available facilities, comprehensive high schools had only about half as many laboratories as vocational schools.

Specialized vocational schools tend to respond appropriately to labor market demands as a result of two factors discussed earlier. The ability to pay instructors higher salaries and the greater flexibility in replacing those no longer essential to a current curriculum contributes to the specialized schools' ability to prepare their students for the current job market.

Two additional characteristics of vocational high schools are mentioned in the literature as contributing to the quality of such delivery systems. The first suggests that students in specialized schools are able to concentrate on vocational experiences without the distraction of those pursuing different goals. The second factor involves the students' attitudes toward the school they are attending. Benson and Hoachlander (1981) found that specialized vocational schools are very popular among the students. What effect this may have on the quality of education is an empirical question, but, with all else equal, it is expected to be a positive characteristic.

School Outcomes

As was mentioned at the beginning of this chapter, very little research has addressed the effectiveness of the different types of vocational institutions in terms of the outcomes for students from those institutions. Limited findings have been reported with respect to students' labor market, educational, and attitudinal outcomes.

Bragg et al. (1986) examined the effect of delivery system type on students' hourly wages and monthly earnings. Area and full-time vocational high schools were compared to comprehensive high schools. The results of Bragg's study do not support the popular notion of the superiority of the area or full-time vocational schools over the comprehensive high schools. The findings indicate that the effect of delivery systems on earnings was

negligible when compared to the effects of student characteristics and environmental factors. The full-time vocational high schools did not differ from the comprehensive high schools. The only significant finding of a delivery system effect on earnings was a negative one for area vocational centers compared to comprehensive high schools.

With respect to educational outcomes, Weberg (1984) found little difference between area vocational and comprehensive high school students except for a higher continuing education rate for comprehensive high school students. A study by Martini (1984) addresses the attitudes of students from the different delivery systems. The results indicate that vocational students in comprehensive high schools were more confident about their social skills and more positive regarding their social autonomy. Students attending area vocational schools had more positive attitudes toward their school and peers than did vocational students attending comprehensive schools. In addition, students from area vocational centers were more positive about their job finding skills and career goals.

Based on the discrepancies seen in the above findings, it is unlikely that conclusions can be drawn as to the superiority of one type of delivery system over the others. However, this study attempts to understand some of the above disagreement by addressing school characteristics, labor market outcomes, and educational outcomes within a single study. Unfortunately, it was unable to address many of the differences in the entry characteristics of students because data were unavailable. The discussion in the remainder of this report attempts to link high school types and their characteristics to student outcomes in order to provide a more comprehensive view of delivery system effectiveness.

CHAPTER 3

METHODOLOGY

Data

This report examines the influences of the institutional setting in which vocational education is offered on (1) labor market outcomes of individuals, such as wage and hours; (2) participation in postsecondary schooling; and (3) immediate outcomes of high school, such as test scores and educational expectations. The objectives of this study contain both descriptive and predictive components. The primary source of data for the analyses was the High School and Beyond (HS&B) survey. Both the main survey (first three waves) and the Supplemental Survey of the HS&B were used. In addition, data from a classroom dynamics survey, being conducted by the National Center for Research in Vocational Education, were used to provide anecdotal evidence concerning the main predictive hypotheses and to enrich the descriptive aspects of the study.

The HS&B database, commissioned by the National Center for Education Statistics (NCES), was designed to build upon the National Longitudinal Survey of the class of 1972 (NLS-72) database to give a broader range of life-cycle factors. These factors include family-formation behavior, intellectual development, and labor market participation. The base year survey was initiated in the spring of 1980 with 30,000 sophomores and 28,000 seniors enrolled in 1,015 public and private schools. The secondary schools were selected in the first stage of sampling. In the second stage, 36 seniors and 36 sophomores were selected randomly within each school. In schools with fewer than 36 seniors or sophomores, all eligible students were included.

The base year questionnaire included information on the students' high school experiences, work experiences, personal and family background, attitudes, and plans for the future. Information was also obtained from administrators about school characteristics, from teachers about their evaluations of students participating in the sample, and from a subset of parents about financing higher education.

The first HS&B follow-up sample in 1982 consisted of the original 30,000 1980 sophomores and 12,000 of the 28,000 1980 seniors. Although the follow-up sample of seniors is reduced in

size from the base year sample, all base year students were included in the universe from which the follow-up sample was selected; therefore, it is representative, with suitable weighting, of the base year group. The second follow-up of this sample was completed in 1984.

The High School and Beyond Transcripts Data Collection was initiated by the NCES under contract with the National Opinion Research Center (NORC) to code transcripts of the 1980 sophomore cohort. It was not feasible within the resources of the survey to attempt to collect the high school transcripts of all of the respondents in the first follow-up sample. Therefore, a further subsample was drawn from that group for transcript collection. The transcripts were collected in the fall of 1982; the target sample consisted of 18,427 of the 30,000 1980 sophomores included in the first follow-up. This sample, as drawn, maximizes the subgroup sizes for such strata as dropouts, students in private schools, selected minority groups, and students whose parents were surveyed in the base year. High school transcripts could not be obtained for every case in the sample. The weighting procedures devised took this into account as well as the sampling specifications of the original sample.

The student transcripts contain information for each secondary-level course taken. Each course includes a six-digit course identification number, the year and term the course was taken, the credits earned, and the final grade. Courses that are a part of special curricula or programs (for example, bilingual education, special education, programs for gifted students) are so identified. In addition, each record includes information on the student's rank in class, overall grade point average, number of days absent, number of days of suspension, the date and reason the student left school, and identifying codes and scores for standardized tests.

In addition to the primary HS&B data, five research institutions formed a consortium to collect supplemental data from principals, teachers, and other staff in approximately half of the original HS&B schools. Members of the consortium shared expenses of a subcontract with NORC to collect the data, cooperated in constructing the survey questionnaires, and divided the work of data preparation. Data collection for the Supplemental Survey of the HS&B occurred in the spring of 1984. It would have been preferable to coordinate the timing of this data collection with that of the first follow-up HS&B survey, in order to describe schools during the time period in which respondents were in attendance. The relatively slow rate of change in institutions such as schools, however, suggests that the timing of the Supplemental Survey is not a serious enough problem to distort the major patterns of relationships.

Five questionnaires were prepared for the supplemental survey, one corresponding to each of five types of respondent: high school principal, teacher, vocational coordinator, head of guidance, and community service coordinator. Up to 30 teachers in each school responded to the teacher questionnaire; only one respondent per school completed each of the other questionnaires. (See Jones, Knight, and Ingels [1984] for more detail on the supplemental data collection).

Data Analysis

There are several major problems that must be addressed in carrying out this type of research. The primary data source (HS&B), although the best available, does not contain sufficient information in some instances. Examples include a lack of information about the area vocational schools, imprecise designation of which students attend them, and little direct information about how teaching may differ from one type of school to another. The gaps in the data were redressed in part by use of data from the ongoing classroom dynamics study. These data were not directly integrated into the HS&B, but provided insight into the patterns that were uncovered by the analyses of the HS&B. Differences in teacher and student attitudes toward the learning situation were examined carefully for possible associations with both individual and institutional outcomes.

Analysis of the HS&B data began with descriptive tables. The tables show the distributions of the outcomes identified in figure 1. These tables address objective 1, but they cannot represent adequately the complexity of relationships suggested by figure 1.

The selection of the specific analytic technique requires careful consideration. As Cohen and Cohen (1983) point out, multiple regression, in the ordinary least squares (OLS) form, is a powerful and general technique; it was the primary form of analysis in this research. There are a number of problems that require special attention, however. Among them is the question of the appropriateness of the additivity assumption. Do women, for example, have the same regression slope as men in relationship to the type of institution they attended? A question such as this requires separate analyses to assess the validity of the assumption and to provide the appropriate correction as necessary.

Another serious and common problem in work with survey data such as HS&B is missing data. When data are missing for an independent, or explanatory, variable the use of dummy variables for missing data is a useful procedure. The coefficient of the missing data variable provides information in and of itself about the

dependent variable with respect to whether or not the group for whom the data are missing differs from those for whom the data are available.

A third problem occurs when the dependent variable takes on only two values. An example is an outcome such as having or not having a job. In this case unrestricted OLS estimates may produce predicted values (y) that fall outside the 0-1 range, and the error variance is heteroscedastic, thus generating inefficient parameter estimates and erroneous standared-error estimates. Although linear probability models with restrictions on y and the use of generalized least squares to correct for heteroscedasticity are feasible, the probit model offers a conceptually more adequate representation of the substantive processes. Probit, however, is expensive and complex to interpret. Logit analysis is an efficient alternative to probit, but it entails the strong behavioral assumption of the independence of irrelevant alternatives. In practice, logit and probit produce quite similar estimates of parameters. OLS estimates also generally are close (to a proportionality constant) to those generated by probit or logit; hence, OLS estimates often can serve a valuable exploratory role.

An important feature of this report is the conduct of analyses at the individual student and the school level. It is axiomatic that if one knows, for example, whether each student in a school dropped out, then one can calculate the dropout rate. Similarly, if one knows the test score of each student in a school, then one can easily calculate the average for the school. To know the effect of x on y at the individual level, however, does not necessarily indicate the effect of the school mean of x (s_j) on the school mean of y (y_j). Firebaugh (1978) developed a coherent interpretation of the discrepancy between individual-level and group-level (in this case school-level) effects. He concluded that the individual-level and group-level effects are equal only if the contextual effect of the group mean on individuals in the group is zero. The strategy in reaching this conclusion is to aggregate both sides of a structural equation containing individual-level and contextual specifications. This is the strategy that was followed. The school-level models were determined by aggregating individual-level models up to the school level. Generally the individual-level models did not contain terms representing contextual effects; hence, if discrepancies between models estimated at the individual and school levels had appeared, a misspecification in the individual-level model due to omission of one or more contextual effects would have been expected. In practice this did not occur in the equations that were estimated. Respecification of individual-level models was therefore not necessary.

Variables

For analytic purposes it is convenient to classify the variables in this report into three categories--dependent variables, primary independent variables, and control variables. Dependent variables include labor market outcomes such as wage, employment, training-related placement, and hours; postsecondary schooling; and immediate outcomes of schooling such as test scores and postsecondary education aspirations. The primary independent variables consist of the typology of vocational education participation and the type of secondary institution in which one studies vocational subjects. Control variables include personal characteristics such as race, gender, and ethnicity; parental characteristics such as education, occupation, and income (SES); region; and type of residence (rural/urban). Detailed description of the variables follows. All variables except the vocational education typology and test scores are defined from information collected on the HS&B surveys.

Dependent Variables

There were three different types of dependent variables. They are presented next.

Labor Market Variables

There are four labor market outcomes of primary interest. These are as follows:

- Labor force participation (1 = labor force, 0 = not in labor force)--defined according to the census definition: one is in the labor force if one worked or was looking for work and out of the labor force otherwise.

- Employment--hours worked per week, reported in broad categories. Category midpoints are used to define numeric values.

- Wage--hourly wage, reported in broad categories. Category midpoints are used to define numeric values.

- Monthly earnings--earned income per month, reported in broad categories and coded to category midpoints.

Postsecondary Schooling Variables

Four postsecondary schooling variables are used as outcomes. These are defined as follows:

- Current enrollment status (1 = currently enrolled, 0 = not currently enrolled)--defined as enrolled in any type of postsecondary educational institution.

- Ever enrolled (1 = enrolled in postsecondary school at some time in the past or currently, 0 = never enrolled).

- Type of postsecondary schooling--consists of two categories: (1) 4-year college or university, (2) 2-year college, including technical school.

Immediate Outcomes

The primary variables in this category are test scores. Six tests were administered as part of the HS&B survey--reading, grammar, vocabulary, math, science, and civics. The math test was subdivided into two parts and the verbal score was an aggregation of the three language tests. These tests were administered to the sophomore cohort in both 1980 and 1982. The standardized version ($\bar{x}$ = 50, s = 10) is the scoring used. The standardized scores for the second administration of the tests as reported by NORC, however, were not used because NORC used second administration means and standard deviations in their calculations, thereby removing changes in averages and standard deviations for the data. Rather, standardized scores applying the first administration means and standard deviations to both sets of test scores were recalculated. The standardization formula used was--

$$x_{s+d} = \frac{10(x-\bar{x})}{s} + 50$$

where

X_{s+d} = standardized test score
x = (number correct)
$\bar{x}$ = mean of x
s = standard deviation of x

Independent Variables

There are two categories of independent variables--high school curriculum and institutional type. These are described in detail below.

High school curriculum. The high school curriculum variables are described in detail in the work that reports their development (Campbell, Orth, and Seitz 1981). Briefly reviewed here, these variables consist of vocational education (five categories), the academic curriculum, and the general curriculum.

The categories of vocational participation were designated Concentrators, Limited Concentrators, Concentrator/Explorers, Explorers, and Incidental/Personals. The Concentrators averaged six or more Carnegie credits in one specialty area, followed the specialty throughout most of the high school years, and continued in it up to graduation. The Limited Concentrators averaged somewhat more than three credits and were less likely to follow a specialty through the senior year. The Concentrator/Explorers averaged two and one-half credits, usually ending specialization before the senior year. Students in the two remaining categories either did not specialize by having a majority of credits in any field or had only a credit or less in a specialty.*

The academic category was assigned to those students who had completed three or more credits each in math and English and two credits each in science and social studies. If a student had completed two or more credits in a foreign language, the math requirement was dropped to two credits. The general curriculum was assigned to all students who could not be classified into one of the other categories. The Explorers and the Incidental/Personals do not have a significant investment in marketable vocational skills; therefore, they were reclassified as academic or general depending upon the other courses they had completed.

This set of categories was used in the regression equations with one further refinement. There is substantial evidence that vocational course work shows its significant labor market effects when the vocational graduate works in a training-related job (Campbell and Basinger 1985; Gardner 1984). Therefore respondents in the vocational groups were further subdivided, for the wage equations, into those who were in training-related jobs and those who were not. A crosswalk between census occupation codes and the content of vocational specialities was used to make this distinction.

One further problem needed to be addressed to make maximum use of the data and to preserve, as far as possible, its generalizability. Transcripts were not available for all respondents. There were, however, self-report data available that permitted a more gross classification than the transcripts provided. Although preliminary tabular analysis had documented that self-report curriculum data were only marginally reliable, (self-report does not coincide with courses shown on the transcript) categories based on these data were used for those for whom transcript classification was not possible.

---

*It is possible for a student to develop each of these patterns in vocational, area vocational, and comprehensive high schools. See Bragg et al. (1986).

Thus, the high school curriculum variable used in the regressions includes up to 10 categories. They are Concentrators, Limited Concentrators, Concentrator/Explorers, Concentrators in training-related jobs, Limited Concentrators in training-related jobs, Concentrator/Explorers in training-related jobs, the academic curriculum, self-report academic curriculum, self-report vocational curriculum, and the general curriculum. For all regressions the omitted reference group consists of those in the general curriculum. All of the other categories are coded in dummy variable form, with the value 1 indicating membership in the category and 0 otherwise.

Institutional characteristics. One of the difficult problems in assessing the effects of vocational education delivery systems resides in differentiating the different types of institutions. In generic terms, there are three major types, but in practice they frequently overlap to some degree. The three types are comprehensive high schools, full-time vocational schools, and area or joint vocational schools. Gilli (1976) has attempted a set of definitions, but his categories are not mutually exclusive. Specifically, he classifies a high school in which students go full-time in vocational subjects as a vocational high school (p. 65) and also as an area vocational school (p. 74). He does provide alternative definitions of other forms, but, if one is trying to understand the effects of the different delivery systems, a more precise definition is necessary. The following definitions were used.

- Vocational high school--a specialized secondary school that offers a full-time program of study in both academic and vocational subjects and in which all or a large majority of the students are enrolled in vocational education programs.

- Area vocational center--a shared-time facility that provides instruction in vocational education only to students from throughout a school system or region. Students attending an area vocational center receive the academic portion of their education program in a regular high school.

- Comprehensive high school--a general high school offering programs in both vocational and general academic subjects, but in which the majority of the students are not enrolled in programs of vocational education.

Control Variables

In specifying models represented by OLS regression equations, it is necessary to include in the models all variables that may be correlated with both the dependent and explanatory

variables in order to ensure that the beta coefficients for the independent variables of primary interest are not biased. That is, a beta coefficient represents the effect of an independent variable on the dependent variable given or holding constant the remaining independent variables in the model. This implies that omitting some or all of these other relevant independent variables changes or biases the beta coefficient because it is holding constant only a subset of the appropriate variables.

It is well known that there are significant differences among the students in the several secondary school curricula. For example, Bragg et al. (1986) found that men are relatively overrepresented in vocational high schools and area vocational centers compared with the comprehensive high schools. The same authors also found that vocational high schools enroll relatively more blacks than the other two types of schools. Additionally, vocational high schools have a larger proportion of low socioeconomic status (SES) students and enroll larger proportions of low academic ability students than do the other two types of schools. Thus, it is clear that gender, race, SES, and academic ability are correlated with at least one of the explanatory variables in this study, namely the type of school. It is also clear, as will be discussed below, that these variables are correlated with the dependent variables that consist of various educational and labor market outcomes. This requires that gender, race, SES, ability, and possibly other individual variables be included as control variables in order to assess the direct effect of the independent variables on the dependent variables. Fortunately, the HS&B database contains data on a variety of such potentially confounding variables.

A number of dependent variables will be examined in this study. Although significant relationships between the control variables and some of the dependent variables have been well documented, other relationships between the control and dependent variables used in this study are not as well known. However, those control variables that have a known effect on at least some of the dependent variables will be included as control variables in predicting all of the dependent variables. This precaution is justified since the lack of an effect of a control variable would prove informative and would have no adverse effect on the validity of the results. The control variables that are used in these analyses and their known relationships with some of the dependent variables of interest are detailed next.

Evidence of gender and race effects on occupational achievement and income is pervasive. Women are concentrated heavily in traditionally female occupations and consistently earn less than men (Bridges 1982; Treiman and Hartman 1981; Mincer and Polacheck 1974). Nonwhites are concentrated in low status occupations and earn substantially less than whites (Portes and Wilson 1976; Smith and Welch 1977; Johnson and Sell 1976).

Status attainment theory (Haller 1982; Horan 1978) holds that career statuses such as education, occupation, and income are passed from one generation to the next. The social status of one's parents affects the level of schooling achieved, which in turn, affects the occupational status level that one achieves. According to this view, minority group members are disadvantaged because, generally, their parents have lower labor market status than members of the white majority.

As previously mentioned, there is a clear association between ability scores and curriculum, and the evidence of an association between labor market and educational outcomes and ability makes it necessary to include a control for this variable. Such a control is essential in order to avoid the bias that would exist in the simple relationship between curriculum and measures of educational and labor market successes, especially wages.

Finally, the location of the community in which the respondent lived when attending school was included as a control variable. An unemployment rate for the respondent's community was also included. Region served as a proxy for differing labor market conditions (for example, type of industry mix, unemployment rate). There is evidence of regional patterns in vocational participation as well. A control variable representing the respondent's community as rural, urban, or suburban was included because there is evidence that wage rates are likely to be lower in rural areas than in suburban or urban areas and because some types of vocational education appear to be more popular in rural areas.

See the Appendix for detailed operational definitions of all control variables.

CHAPTER 4

RESULTS

The focus in this research has been to determine the nature and extent of variations in the characteristics of three different types of secondary educational institutions (comprehensive, full-time vocational, and area vocational) and, further, to examine the influence of these characteristics on outcomes for students. Hourly wages and monthly earnings were the labor market outcomes selected. Participation in postsecondary education, standardized test scores, school attendance, and dropping out were the educational experience variables.

Results presented here address the research questions posed in chapter 1. In some instances our original intentions to pursue particular areas of interest had to be modified due to the limitations of the data. The HS&B data were judged the best available to provide information in the area of institutional characteristics; however, even these data were limited because relatively few vocational schools are included. In addition, attending an area vocational school could be determined with reasonable precision only for the HS&B Senior Cohort and there was no way to describe such schools in terms of staff, facilities, curriculum, and so forth. For these reasons an additional data source--the qualitative information secured through debriefings of staff who observed classes in the three types of schools--was used. These staff reports were based on observations made in hundreds of high school classrooms. They extend the findings of the HS&B data and are reported elsewhere in this chapter.

The tables should be examined with several conventions kept in mind. Although material for full-time vocational high schools was limited, actual figures are reported in the margins of the tables even if those numbers represent fewer than the customary minimum of 25 cases that were employed in reporting descriptive results. Within the body of the tables, however, instances of less than 25 observations are not given. Marginal totals are reported in all cases to provide the reader with a sense of overall distributions, but caution should be exercised in interpreting these figures. Within the comprehensive high school classification, separate entries are presented for vocational and nonvocational students to give a more complete comparison of the vocational program and its participants between school types.

A major portion of this chapter is devoted to the statistical analyses of the HS&B data. The primary analysis is multivariate, (OLS) with probit estimations reported where applicable. These tables are organized with individual-level regressions first followed by the institutional-level results, reflecting the order of the research objectives stated in chapter 1.

Facilities, Personnel, and Programs

Tables 1 and 2 provide a look at facilities and support personnel and programs available in two delivery systems (vocational and comprehensive). Area vocational schools could not be identified in the database for these descriptive purposes. Several distinctions are worthy of mention. Average enrollments in vocational high schools tend to be slightly higher, but faculties are also larger than in comprehensive schools. Hence, the teacher-pupil ratios are virtually identical (table 1). Other personnel/services available are very similar, with the exception of the presence of a program for gifted students. The likelihood of finding such a program in a comprehensive school is about three times greater than that of finding one in a vocational school.

Comprehensive schools exhibit a higher percentage of career information centers, media production facilities, and subject and staff resource centers. The vocational schools hold the edge in percentages of occupational training centers and remedial math/reading laboratories. The average number of volumes in the vocational school libraries is approximately one-third the number in the comprehensive schools. Both types of schools provide career information centers and remedial laboratories as the most commonly available student service facilities. Child-care facilities for use by students are not used extensively in either school type.

Regional location and community type for vocational and comprehensive schools are shown in table 3. Although the number of vocational schools for which data were available is small, one can make several tentative observations. Of the 18 vocational schools represented, eight are located in urban areas. The urban schools have the largest enrollments followed by the suburban, then the rural schools. The comprehensive high school is located primarily in the suburbs in all sections of the country. It is interesting to note that in the south, the rural comprehensive schools are just as numerous as the suburban ones; this is not true in any other part of the country.

Three differences in staff characteristics are highlighted in table 4. First, a smaller percentage of teachers in the vocational schools hold bachelor's, master's, or doctoral degrees. A comparison of vocational teachers in each type of delivery system

TABLE 1

COMPARISON OF STUDENT SUPPORT PERSONNEL AND PROGRAMS FOR VOCATIONAL AND COMPREHENSIVE SCHOOLS
(Averages)

	VOCATIONAL		COMPREHENSIVE	
Personnel/Service	n	Staff-Pupil Ratio	n	Staff-Pupil Ratio
Students	1426		1380	
Teachers	81	1:18	69	1:20
Counselors	4	1:328	4	1:349
Psychologists	less than 1	1:2263	less than 1	1:3210
Remedial Specialists	2	1:648	2	1:648

		VOCATIONAL		COMPREHENSIVE		MISSING
	Total n	Yes	No	Yes	No	
Bilingual Program	859	5	15	275	542	22
Pregnancy Program	859	8	12	354	464	21
Gifted Program	859	4	15	488	333	19

NOTE: Numbers rounded to nearest whole.

TABLE 2

FACILITIES AVAILABLE BY SCHOOL TYPE

(Averages and Percentages)

Facilities	Total n and %	VOCATIONAL Yes	VOCATIONAL No	COMPREHENSIVE Yes	COMPREHENSIVE No	MISSING
Career Information Center	859 100.00	14 1.63	6 0.70	725 84.40	110 12.81	4 0.47
Occupational Training Center	859 100.00	7 0.81	13 1.51	225 26.19	610 71.01	4 0.47
Media Production Facility	859 100.00	9 1.05	11 1.28	451 52.50	384 44.70	4 0.47
Remedial Math/ Reading Lab.	859 100.00	17 1.98	3 0.35	586 68.22	249 28.99	4 0.47
Subject Resource Center	859 100.00	4 0.47	16 1.86	217 25.26	618 71.94	4 0.47
Staff Resource Center	859 100.00	3 0.35	17 1.98	294 34.23	541 62.98	4 0.47
Child Care Facility	859 100.00	5 0.58	15 1.75	139 16.18	696 81.02	4 0.47
Library Average number of volumes		1267		4100		

TABLE 3

VOCATIONAL AND COMPREHENSIVE HIGH SCHOOLS BY REGION AND COMMUNITY TYPE
(Number and Average Size)

Region/ Community Type	VOCATIONAL n	VOCATIONAL Size	COMPREHENSIVE n	COMPREHENSIVE Size
Northeast				
Urban	2	2,391	45	2,298
Rural	2	1,011	30	958
Suburban	4	1,201	83	1,348
West				
Urban	Not observed		32	2,066
Rural	Not observed		41	935
Suburban	1	1,303	82	1,679
South				
Urban	3	1,611	32	1,655
Rural	Not observed		59	920
Suburban	Not observed		60	1,587
Midwest				
Urban	3	2,196	43	1,619
Rural	Not observed		74	611
Suburban	1	587	115	1,489
Unclassifiable	2	376	88	1,223
Total n	18		784	

TABLE 4

A COMPARISON OF TEACHING STAFF CHARACTERISTICS FOR
VOCATIONAL AND COMPREHENSIVE HIGH SCHOOLS

	VOCATIONAL	COMPREHENSIVE
Total Number of Schools	20	839
Average Number of Teachers	81	69
Percentage of Teachers with B.A.	20	37
Percentage of Teachers with M.A./Ph.D.	41	56
Percentage of Teachers with Associate or No Degree (Vocational Teachers)	16	less than 1
Percentage of Teachers with Associate or No Degree (Academic Teachers)	1	less than 1
Percentage of Teachers - Unclassifiable	21	6
Average Years Teaching Experience	7	10
Average Years Work Experience (Vocational Teachers)	14	6
Percentage of Teachers with Tenure in Current School	72	84
Average Salary - Beginning Teacher	10,514	10,562
Number of Inservice or Interviews/year	2	3
Number of Teacher Evaluations/year	3	2
Percentage of Teachers Absent/day	5	4
Percentage of Female Staff	40	48

NOTES: Figures represent 1980 data. Numbers rounded to nearest whole.

shows a higher percentage in the vocational schools with an associate degree or no degree at all. Second, teachers from the vocational schools exhibit over twice as many years of work experience as the vocational teachers in the comprehensive schools (14 versus 6 years). The comprehensive teachers have, in turn, a higher average number of years of teaching experience and rate of tenure. Third, the vocational schools employ a higher proportion of male teachers than the comprehensive schools. Other staff characteristics are very similar for both delivery systems.

Characteristics of Students

Based on transcript data from the sophomore cohort, table 5 identifies student specialty by race/ethnicity and gender for each school type. The trade and industry programs in the vocational schools represent almost half of the students enrolled with a heavy concentration of male students. Business courses are most heavily attended in the comprehensive schools, and participants are primarily female.

Black students are twice as likely to be represented in the vocational school as in the comprehensive school. Overall, men and women are fairly evenly distributed in the comprehensive schools; in the vocational schools the ratio of men to women is approximately 3:2.

Those students who have taken vocational courses, but not enough in one area to develop a specialty, are classified as "no specialty." These students are twice as likely to be enrolled in the comprehensive schools. Students are described as "unclassifiable" if any of the information from their transcripts was missing or incomplete.

Student choice of vocational specialty by the pattern of participation in the curriculum is shown in table 6. These data are based on the transcript information. The limitations of the data do not permit a full comparison between each of the specialties in the vocational and comprehensive schools; however, one can see the popularity of the trade and industry program in the vocational school (48 percent versus 21 percent in the comprehensive school) and the tendency to concentrate in that area. Comparing totals for each delivery system reveals the proportion of Concentrators to be about three times greater in the vocational schools.

Socioeconomic status by curriculum specialty for sophomores is presented in table 7. Results are noteworthy in several respects. A comparison of the total percentages for each school type shows a distinctly uneven student distribution among the SES quartiles in the vocational schools. Over half of those enrolled are concentrated in the lower SES quartiles (58 percent versus 48 percent in the comprehensive high schools). Over half (57

TABLE 5

SPECIALTY BY RACE/ETHNICITY AND GENDER FOR EACH TYPE OF DELIVERY SYSTEM
SOPHOMORES

(Percentage Distributions)

Specialty	Total n and %	MALES					FEMALES				
		White	Black	Hispanic	Native American	Other	White	Black	Hispanic	Native American	Other
					VOCATIONAL						
Agriculture	0 0.00	..	..	..	..	..	..	..	..	..	..
Business	32 15.26	2.03	0.00	0.00	1.06	0.79	8.57	1.67	0.88	0.00	0.30
Marketing	4 2.39	..	..	..	..	..	..	..	..	..	..
Health	1 1.20	..	..	..	..	..	..	..	..	..	..
Occupational Home Economics	5 1.97	..	..	..	..	..	..	..	..	..	..
Trade & Industry	87 47.74	22.72	9.66	5.57	0.05	1.94	3.75	3.36	0.39	0.30	0.00
No Specialty	28 16.25	0.41	2.22	0.40	0.15	0.00	6.02	1.93	2.83	0.30	0.00
Unclassifiable	25 15.20	6.62	0.54	0.00	0.46	0.46	3.55	1.01	1.32	0.00	1.23
Total n and %	182 100.00	55 34.18	26 13.10	18 5.98	4 1.72	4 3.20	29 23.39	26 10.59	16 5.72	2 0.60	2 1.53

NOTE: Percentages are weighted; numbers are unweighted.

TABLE 5--Continued

Specialty	Total n and %	MALES White	Black	Hispanic	Native American	Other	FEMALES White	Black	Hispanic	Native American	Other
					COMPREHENSIVE						
Agriculture	247 2.45	1.66	0.06	0.33	0.02	0.04	0.28	0.06	0.01	0.00	0.00
Business	3709 33.94	6.80	0.75	0.89	0.08	0.20	19.50	2.59	2.25	0.34	0.53
Marketing	126 1.26	0.48	0.08	0.12	0.00	0.00	0.43	0.09	0.04	0.01	0.01
Health	63 0.53	0.09	0.01	0.01	0.00	0.00	0.26	0.11	0.03	0.00	0.01
Occupational Home Economics	196 1.75	0.54	0.04	0.06	0.00	0.01	0.77	0.09	0.19	0.02	0.03
Trade & Industry	2192 20.57	11.73	1.78	2.60	0.46	0.55	2.28	0.53	0.50	0.04	0.09
No Specialty	3239 31.39	10.65	1.84	2.24	0.24	1.07	11.00	1.73	1.87	0.14	0.62
Unclassifiable	786 8.11	3.10	0.48	0.61	0.04	0.09	2.79	0.36	0.52	0.05	0.08
Total n and %	10616 100.00	3191 35.08	571 5.04	1146 6.86	119 0.84	220 1.95	3431 37.30	613 5.56	1016 5.42	106 0.59	203 1.38

TABLE 6

SPECIALTY BY CURRICULUM PATTERN
FOR EACH TYPE OF DELIVERY SYSTEM
SOPHOMORES

(Percentage Distributions)

Specialty	VOCATIONAL					COMPREHENSIVE				
	Total n and %	Concentrator	Limited Concentrator	Concentrator Explorer	Unclassi-fiable	Total n and %	Concentrator	Limited Concentrator	Concentrator Explorer	Unclassfiable
Agriculture	0 0.00	--	--	--	--	247 2.45	0.89	0.50	0.52	0.55
Business	32 15.26	4.75	4.13	3.44	2.93	3709 33.94	6.03	8.33	6.31	13.28
Marketing	4 2.39	--	--	--	--	126 1.26	0.04	0.75	0.13	0.33
Health	1 1.20	--	--	--	--	63 0.53	0.02	0.19	0.08	0.24
Occupational Home Ec.	5 1.97	--	--	--	--	196 1.75	0.03	0.33	0.43	0.96
Trade & Industry	87 47.74	20.61	9.45	6.93	10.76	2192 20.57	3.97	6.66	3.40	6.54
No Specialty	28 16.25	0.00	0.00	0.00	16.25	3297 31.39	0.00	0.00	0.00	31.39
Unclassi-fiable	25 15.20	0.00	0.00	0.00	15.20	786 8.11	0.00	0.00	0.00	8.11
Total n and %	182 100.00	61 30.38	18 13.58	18 10.74	85 45.30	10616 100.00	1063 10.98	1779 16.75	1150 10.86	6624 61.41

NOTE: Percentages are weighted; numbers are unweighted.

TABLE 7

SOCIOECONOMIC STATUS BY SPECIALTY
FOR EACH TYPE OF DELIVERY SYSTEM
SOPHOMORES

(Percentage Distributions)

	VOCATIONAL						COMPREHENSIVE					
		SES Quartile						SES Quartile				
Specialty	Total n and %	Low	2d	3rd	High	Missing	Total and %	Low	2d	3rd	High	Missing
Agriculture	0						247					
	0.00	--	--	--	--	--	2.28	0.63	0.71	0.66	0.25	0.03
Business	32						3709					
	12.56	2.66	3.62	6.09	0.00	0.19	31.09	7.22	7.68	8.12	7.29	0.78
Marketing	4						126					
	2.17	--	--	--	--	--	1.19	0.30	0.29	0.24	0.32	0.04
Health	1						63					
	0.84	--	--	--	--	--	0.49	0.12	0.08	0.21	0.08	0.00
Occupational Home Economics	5						196					
	1.97	--	--	--	--	--	1.69	0.34	0.31	0.36	0.56	0.12
Trade & Industry	87						1292					
	37.51	12.16	9.22	8.16	6.14	1.83	19.12	5.02	4.98	4.39	3.91	0.83
No Specialty	28						3297					
	13.47	1.84	4.57	2.60	1.46	3.01	27.13	5.95	5.39	6.49	6.88	2.42
Unclassifiable	80						2065					
	31.48	10.50	9.50	6.13	1.94	3.40	17.01	4.39	4.14	3.42	3.09	1.96
Total n	237	77	66	52	21	21	11895	3280	2724	2762	2630	499
and %	100.0	27.99	30.01	23.90	9.55	8.54	100.00	23.97	23.59	23.89	22.38	6.17

NOTE: Percentages are weighted; numbers are unweighted.

percent) of the trade and industry students enrolled in the vocational schools are in the lower SES quartiles. Among the comprehensive school students there is a fairly uniform distribution by SES.

Table 8 describes socioeconomic status by ability for sophomores. The most striking difference between the two types of schools can be seen in the larger proportion of students in the combined lower SES and ability quartiles who are enrolled in vocational high schools. The difference between the two schools is more pronounced with regard to academic ability as measured by written test. The lower two ability quartiles represent 68 percent of the vocational school enrollment. Conversely, the proportion of high-ability students in the vocational schools is approximately one-third that of the comprehensive schools for both vocational and nonvocational students. The SES and ability composition of the vocational student body in the comprehensive schools closely resembles that of the nonvocational students.

Figures for the two groups of comprehensive students reflect the widely observed relationship between SES and academic ability: the proportion of higher-ability students is greater in the higher socioeconomic quartiles. This selectivity of school type, through choice or assignment, must be kept in mind when examining the outcomes of vocational education programs.

Table 9 describes socioeconomic status by ability for seniors. Findings are very similar to those for the sophomores; however, there is a greater difference in percentages of those in the lower SES/ability groups between the comprehensive vocational students and the nonvocational students (50 percent versus 29 percent, respectively).

Table 10 provides information about area vocational students regarding SES and academic ability. The distribution of students among the SES and academic quartiles is very similar to that of the comprehensive schools. As noted before, this distribution is skewed toward the lower quartiles in the vocational schools.

Tables 11 and 12 present enrollment information from the sophomore and senior cohort, respectively, based on socioeconomic status by race/ethnicity and gender for each type of delivery system. Black students, both men and women, tend to be overrepresented in the vocational high schools. Black enrollment patterns are very similar in the comprehensive schools for vocational and nonvocational students. White women, on the other hand, tend to be underrepresented in the vocational high schools (25 percent), whereas white male enrollment percentages are very similar in all three instances. Hispanic enrollment patterns are fairly uniform in all three classifications.

TABLE 8

SOCIOECONOMIC STATUS BY ACADEMIC ABILITY
FOR VOCATIONAL AND COMPREHENSIVE HIGH SCHOOLS
SOPHOMORES
(Percentage Distributions)

	VOCATIONAL						COMPREHENSIVE (Nonvocational Students)						COMPREHENSIVE (Vocational Students)					
		Academic Ability						Academic Ability						Academic Ability				
SES	Total n and %	Low	2d	3rd	High	Missing	Total n and %	Low	2d	3rd	High	Missing	Total n and %	Low	2d	3rd	High	Missing
Low	153						3706						2065					
	28.87	11.50	11.40	4.59	0.64	0.74	20.58	7.92	6.11	3.99	2.17	0.39	22.85	8.85	6.58	4.89	2.16	0.36
2d	148						3464						1900					
	25.41	8.73	8.52	5.68	2.35	0.11	21.13	4.75	5.85	5.78	4.55	0.20	22.83	5.08	6.44	6.41	4.55	0.36
3rd	91						3448						1844					
	15.90	3.09	5.38	4.12	3.13	0.18	21.02	2.87	5.10	6.25	6.35	0.45	22.73	3.30	5.37	7.14	6.37	0.54
High	45						3454						1532					
	8.58	1.12	2.99	1.74	1.69	1.03	21.02	1.25	3.72	5.77	10.41	0.32	19.39	1.30	3.38	5.56	8.77	0.39
Missing	101						2564						1016					
	21.25	10.74	4.77	4.80	0.51	0.43	16.26	7.99	4.50	2.12	0.93	0.72	12.20	5.89	2.99	2.12	0.75	0.46
Total	538	179	176	102	51	30	16636	4027	4067	3886	4084	572	8357	2037	2079	2107	1922	212
n and %	100.00	35.18	33.06	20.94	8.33	2.49	100.00	24.77	24.83	23.91	24.41	2.08	100.00	24.42	24.76	26.11	22.60	2.11

NOTE: Percentages are weighted; numbers are unweighted.

TABLE 9

SOCIOECONOMIC STATUS BY ACADEMIC ABILITY
FOR VOCATIONAL AND COMPREHENSIVE HIGH SCHOOLS
SENIORS
(Percentage Distributions)

	VOCATIONAL						COMPREHENSIVE (Nonvocational Students)						COMPREHENSIVE (Vocational Students)					
		Academic Ability						Academic Ability						Academic Ability				
SES	Total n and %	Low	2d	3rd	High	Missing	Total n and %	Low	2d	3rd	High	Missing	Total n and %	Low	2d	3rd	High	Missing
Low	109 32.43	8.61	11.22	4.96	0.84	6.80	1816 17.27	7.07	4.12	2.48	1.78	1.81	1803 26.58	9.52	7.26	5.37	1.91	2.52
2d	60 23.64	5.04	5.25	3.54	4.77	5.04	1013 16.00	3.51	3.48	3.90	3.60	1.50	1146 27.82	6.33	8.18	6.67	3.76	2.87
3rd	28 15.88	3.16	0.75	4.81	1.17	5.99	982 17.63	2.15	3.11	4.69	6.21	1.47	969 25.89	5.65	6.52	6.96	4.14	2.62
High	13 6.40	—	—	—	—	—	1044 22.12	1.33	3.16	4.59	9.91	3.13	622 17.32	2.02	3.50	4.98	5.04	1.78
Missing	23 22.78	—	—	—	—	—	582 26.98	0.90	0.20	0.09	0.15	25.65	134 2.38	1.26	0.36	0.21	0.05	0.49
Total n and %	233 100.00	70 19.23	57 20.97	30 14.67	14 7.89	62 37.24	5437 100.00	1462 14.96	946 14.08	901 15.74	1208 21.65	920 33.57	4674 100.00	1547 24.78	1103 25.83	906 24.19	678 14.91	440 10.28

NOTE: Percentages are weighted; numbers are unweighted.

TABLE 10

SOCIOECONOMIC STATUS BY ACADEMIC ABILITY
FOR EACH TYPE OF DELIVERY SYSTEM
SOPHOMORES
(Vocational Students Only)
Percentage Distributions

	VOCATIONAL						COMPREHENSIVE						AREA VOCATIONAL					
		Academic Ability						Academic Ability						Academic Ability				
SES	Total n and %	Low	2d	3rd	High	Missing	Total n and %	Low	2d	3rd	High	Missing	Total n and %	Low	2d	3rd	High	Missing
Low	155 35.06	13.20	13.96	6.32	0.71	0.87	791 27.71	9.94	9.19	6.24	1.95	0.39	176 29.39	9.53	9.80	6.14	2.87	1.05
2d	144 28.87	9.45	9.33	7.21	2.79	0.09	692 27.07	5.51	7.83	8.10	5.42	0.22	172 29.14	5.93	9.03	9.15	4.71	0.31
3rd	92 20.61	5.41	6.45	4.85	3.69	0.21	700 26.06	3.93	6.82	8.03	6.88	0.40	133 23.13	3.25	6.87	6.83	5.34	0.83
High	46 12.16	1.11	3.97	3.89	1.99	1.21	459 17.86	2.04	4.80	5.65	4.97	0.40	105 16.84	1.95	3.26	5.21	6.16	0.26
Missing	32 3.30	1.74	0.76	0.51	0.00	0.29	66 1.30	0.76	0.24	0.19	0.08	0.04	15 1.50	—	—	—	—	—
Total n and %	469 100.00	142 30.90	160 34.46	96 22.79	50 9.18	21 2.66	2708 100.00	619 22.19	793 28.87	730 28.20	525 19.29	41 1.44	601 100.00	136 21.03	177 26.69	154 27.52	118 19.31	16 2.45

SOURCE: Vocational Education Delivery Systems and Specialization: Impact on Groups of Special Interest, Campbell et al., (1985).

NOTE: Percentages are weighted; numbers are unweighted.

TABLE 11

SOCIOECONOMIC STATUS BY RACE/ETHNICITY AND GENDER
FOR EACH TYPE OF DELIVERY SYSTEM
SOPHOMORES

(Percentage Distributions)

Race/Ethnicity Gender	VOCATIONAL Total n and %	SES Quartile Low	2d	3rd	High	Missing	COMPREHENSIVE (Nonvocational Students) Total n and %	SES Quartile Low	2d	3rd	High	Missing	COMPREHENSIVE (Vocational Students) Total n and %	SES Quartile Low	2d	3rd	High	Missing
White																		
Male	192 34.97	6.64	9.70	5.91	6.10	6.63	5396 35.27	5.03	7.08	8.70	8.98	5.48	2791 36.29	6.32	8.17	9.10	8.17	4.53
Female	103 24.52	5.36	5.52	4.02	0.97	8.64	5630 36.83	6.06	8.44	8.22	9.40	4.71	2927 37.97	6.51	9.01	9.69	9.15	3.61
Black																		
Male	78 15.62	4.65	5.07	2.30	1.06	2.54	946 5.75	1.92	1.14	0.72	0.39	1.58	435 4.92	1.91	1.19	0.49	0.24	1.09
Female	76 12.44	5.78	3.81	1.80	0.05	1.00	1085 6.32	2.58	1.35	0.77	0.47	1.14	506 5.59	2.51	1.36	0.80	0.23	0.69
Hispanic																		
Male	37 5.64	2.75	0.90	0.68	0.12	1.19	1460 7.11	2.28	1.53	1.14	0.58	1.57	759 6.91	2.65	1.40	1.14	0.84	0.88
Female	27 4.45	2.42	0.09	0.94	0.27	0.73	1364 5.80	2.13	1.00	0.79	0.62	1.27	637 5.48	2.42	1.11	0.81	0.40	0.74
Native American																		
Male	5 0.82	..	..	..	..	..	105 0.84	0.18	0.23	0.11	0.09	0.24	46 0.79	0.14	0.06	0.32	0.06	0.22
Female	2 0.39	..	..	..	..	..	90 0.51	0.15	0.04	0.13	0.06	0.13	41 0.63	0.18	0.15	0.04	0.00	0.26
Asian																		
Male	3 0.82	..	..	..	..	..	132 0.70	0.08	0.17	0.17	0.24	0.04	52 0.60	0.07	0.26	0.14	0.11	0.02
Female	0 0.00	..	..	..	..	..	131 0.66	0.11	0.15	0.22	0.17	0.02	55 0.51	0.12	0.08	0.12	0.16	0.03
Other																		
Male	11 0.25	..	..	..	..	..	185 0.16	0.04	0.01	0.02	0.02	0.08	68 0.21	0.02	0.03	0.05	0.04	0.07
Female	4 0.08	..	..	..	..	..	112 0.06	0.03	0.00	0.01	0.02	0.01	40 0.10	0.00	0.00	0.03	0.00	0.07
Total n and %	538 100.00	153 28.87	148 25.41	91 15.90	45 8.58	101 21.25	16636 100.00	3706 20.58	3464 21.13	3448 21.02	3454 21.02	2564 16.26	8357 100.00	2065 22.85	1900 22.83	1844 22.73	1532 19.39	1016 12.20

NOTE: Percentages are weighted; numbers are unweighted.

TABLE 12

SOCIOECONOMIC STATUS BY RACE/ETHNICITY AND GENDER FOR EACH TYPE OF DELIVERY SYSTEM
SENIORS

(Percentage Distributions)

Race/Ethnicity Gender	VOCATIONAL Total n and %	SES Quartile Low	2d	3rd	High	Missing	COMPREHENSIVE (Nonvocational Students) Total n and %	SES Quartile Low	2d	3rd	High	Missing	COMPREHENSIVE (Vocational Students) Total n and %	SES Quartile Low	2d	3rd	High	Missing
White																		
Male	45						1223						1033					
	39.34	5.61	9.88	6.99	5.80	11.07	36.93	3.73	5.84	7.89	9.98	9.49	38.07	7.61	9.76	11.21	8.51	0.98
Female	25						1372						1145					
	23.95	11.47	5.89	5.49	0.00	1.10	39.69	5.65	6.61	7.09	10.19	10.15	39.77	9.00	12.87	10.96	6.56	0.38
Black																		
Male	62						603						458					
	15.11	5.90	3.11	1.45	0.50	4.15	5.41	1.82	0.83	0.67	0.44	1.64	4.23	1.87	0.95	0.76	0.40	0.26
Female	50						669						663					
	8.33	4.65	1.85	0.98	0.00	0.86	5.82	2.50	0.84	0.55	0.33	1.59	6.00	3.09	1.31	0.79	0.53	0.27
Hispanic																		
Male	20						595						543					
	6.11	—	—	—	—	—	4.10	1.42	0.70	0.42	0.38	1.19	4.84	2.04	1.12	0.95	0.54	0.20
Female	23						600						598					
	4.19	—	—	—	—	—	4.15	1.60	0.79	0.49	0.36	0.90	4.79	2.31	1.28	0.74	0.25	0.21
N. American																		
Male	3						51						54					
	.70	—	—	—	—	—	0.30	0.08	0.08	0.04	0.07	0.03	0.48	0.16	0.11	0.05	0.15	0.01
Female	0						40						41					
	0.00		Not observed				0.30	0.09	0.09	0.05	0.04	0.02	0.36	0.15	0.13	0.05	0.03	0.00
Asian																		
Male	1						103						61					
	0.03	—	—	—	—	—	0.73	0.12	0.11	0.13	0.21	0.16	0.52	0.10	0.10	0.14	0.17	0.01
Female	1						101						64					
	0.25	—	—	—	—	—	0.90	0.18	0.10	0.23	0.13	0.26	0.64	0.17	0.10	0.20	0.16	0.00
Other																		
Male	1						41						9					
	0.00	—	—	—	—	—	1.10	0.01	0.00	0.06	0.00	1.03	0.21	—	—	—	—	—
Female	2						39						5					
	1.98	—	—	—	—	—	0.58	0.05	0.00	0.01	0.00	0.52	0.10	—	—	—	—	—
Total n and %	233	109	60	28	13	23	5437	1816	1013	982	1044	582	4674	1803	1146	969	622	134
	100.00	32.43	23.64	15.88	6.77	21.28	100.00	17.27	16.00	17.63	22.12	26.98	100.00	26.58	27.82	25.89	17.32	2.38

NOTE: Percentages are weighted; numbers are unweighted.

Table 13 is a comparison of vocational and comprehensive school enrollment of sophomores in terms of race, ethnicity, and gender by patterns of participation in vocational education. The number of respondents in each classification is sufficient to permit comparisons between majority white and black respondents only. As previously observed, the percentage of Concentrators is about three times higher in the vocational schools as compared with the comprehensive institutions. This is the major difference between the two systems; percentages representing the remaining curriculum patterns, Limited Concentrators and Concentrator/Explorers, are very similar for both school types.

The present postsecondary status for sophomores and seniors is examined in tables 14 and 15. Vocational and nonvocational graduates of comprehensive high schools were more likely to go on to college than were the graduates of vocational high schools. The total percentage of sophomores who enrolled in some form of higher education was the same for both types of comprehensive school students (57 percent). A slightly higher proportion of comprehensive vocational students chose 2-year colleges over 4-year colleges. In contrast to the sophomore data, however, the senior figures show a difference of 11 percent between college enrollment for comprehensive nonvocational and comprehensive vocational students (58 percent versus 47 percent). In general, women from comprehensive schools participate in postsecondary education in greater percentages than their male counterparts, regardless of program type (vocational or nonvocational). This pattern is not evident for vocational school graduates.

There are differences in postsecondary employment figures for sophomores and seniors. Of the senior cohort about one-third of the vocational high school graduates and the vocational students from the comprehensive schools were employed, whereas approximately one-fourth of the nonvocational students were employed. For all three groups from the senior cohort, there were far more who were not employed, but looking for work in the labor force than is evident in the sophomore figures. In the sophomore cohort, slightly over half of the vocational school graduates are employed, but about twice as many of them are not employed and not in the labor force (11 percent) when compared with either group of the comprehensive school graduates (5 and 4 percent). This may be a function of the groups the vocational schools serve--low SES and minority. These groups historically have had less success in the labor market.

Hours and Wages--Sophomore Cohort

Hours and wages for members of the sophomore cohort are shown in table 16. Unlike data for the senior cohort, the sophomore figures generally show no hourly wage advantage for comprehensive vocational students as compared with comprehensive nonvocational

TABLE 13

RACE/ETHNICITY AND GENDER BY CURRICULUM PATTERN FOR EACH TYPE OF DELIVERY SYSTEM
SOPHOMORES

(Percentage Distributions)

Race/Ethnicity Gender	VOCATIONAL Total n and %	Concentrator	Limited Concentrator	Concentrator Explorer	Unclassifiable	COMPREHENSIVE Total n and %	Concentrator	Limited Concentrator	Concentrator Explorer	Unclassifiable
White										
Male	55 34.18	11.63	6.59	3.37	12.59	3191 35.07	3.53	6.60	3.33	21.61
Female	29 23.39	5.72	1.20	2.86	13.61	3431 37.30	4.81	5.78	4.42	22.29
Black										
Male	26 13.10	4.10	1.39	3.18	4.43	571 5.04	0.33	0.84	0.56	3.31
Female	26 10.59	4.46	1.90	0.37	3.86	613 5.56	0.56	1.04	0.71	3.25
Hispanic										
Male	18 5.98	--	--	--	--	1146 6.86	0.72	1.25	0.67	4.23
Female	16 5.72	--	--	--	--	1016 5.42	0.60	0.72	0.60	3.49
Native American										
Male	4 1.72	--	--	--	--	119 0.84	0.17	0.16	0.14	0.38
Female	2 0.60	--	--	--	--	106 0.59	0.03	0.07	0.11	0.38
Other										
Male	4 3.20	--	--	--	--	220 1.95	0.13	0.16	0.22	1.44
Female	2 1.53	--	--	--	--	203 1.38	0.10	0.14	0.12	1.01
Total n and %	182 100.00	61 30.38	18 13.58	18 10.74	85 45.30	10616 100.00	1063 10.98	1779 16.75	1150 10.86	6624 61.41

NOTE: Percentages are weighted; numbers are unweighted.

TABLE 14

PRESENT STATUS OF STUDENTS FROM EACH TYPE OF DELIVERY SYSTEM BY RACE/ETHNICITY AND GENDER
SOPHOMORES

(Percentage Distributions)

Status	Total n and %	MALE White	Black	Hispanic	Native American	Asian	Other	FEMALE White	Black	Hispanic	Native American	Asian	Other
					VOCATIONAL								
Postsecondary Enrollment													
2-Year*	26												
	12.01	1.63	1.09	0.67	0.17	0.00	--	5.80	1.74	0.59	0.33	--	--
4-Year	43												
	24.30	7.35	6.35	0.00	0.00	0.88	--	5.59	2.83	1.30	0.00	--	--
No Postsecondary Enrollment													
Employed	113												
	51.07	23.41	4.64	5.11	1.68	0.43	--	6.84	4.64	3.99	0.33	--	--
In Labor Force, Not Employed	4												
	1.45	--	--	--	--	--	--	--	--	--	--	--	--
Not Employed, Not in Labor Force**	16												
	11.17	--	--	--	--	--	--	--	--	--	--	--	--
Total	202	58	30	19	3	3	0	39	27	21	2	0	0
n and %	100.00	33.74	14.17	6.29	1.85	1.82	0.00	24.41	10.74	6.33	0.66	0.00	0.00
					COMPREHENSIVE (Nonvocational Students)								
Postsecondary Enrollment													
2-Year*	1210												
	17.01	5.61	0.51	1.06	0.10	0.12	0.01	7.20	1.10	1.07	0.14	0.10	0.00
4-Year	2859												
	40.03	15.68	1.10	1.32	0.18	0.48	0.00	17.06	1.84	1.71	0.11	0.50	0.04

NOTE: Percentages are weighted; numbers are unweighted.

*Includes vocational technical schools and other non 4-year postsecondary institutions.

**Includes housewives and/or homemakers.

TABLE 14--Continued

Status	Total n and %	MALE White	Black	Hispanic	Native American	Asian	Other	FEMALE White	Black	Hispanic	Native American	Asian	Other
No Postsecondary Enrollment													
Employed	2238												
	34.69	12.80	2.76	3.52	0.25	0.09	0.06	11.80	1.05	2.03	0.25	0.08	0.00
In Labor Force, Not Employed	214												
	3.11	0.43	0.61	0.50	0.00	0.02	0.00	0.41	0.85	0.24	0.04	0.00	0.00
Not Employed, Not in Labor Force**	410												
	5.16	1.19	0.43	0.26	0.04	0.02	0.02	1.93	0.55	0.59	0.09	0.03	0.01
Total	6931	2066	404	766	64	106	6	2213	426	696	67	113	4
n and %	100.00	35.70	5.40	6.67	0.57	0.73	0.09	38.41	5.40	5.64	0.62	0.71	0.05
					COMPREHENSIVE (Vocational Students)								
Postsecondary Enrollment													
2-Year*	857												
	22.49	6.56	0.60	1.33	0.15	0.16	0.04	10.23	1.99	1.16	0.12	0.10	0.04
4-Year	1356												
	33.80	11.94	1.09	1.39	0.09	0.44	0.15	14.64	2.23	1.33	0.10	0.38	0.01
No Postsecondary Enrollment													
Employed	1308												
	37.96	14.70	2.04	3.37	0.91	0.11	0.10	13.00	1.19	2.17	0.24	0.11	0.00
In Labor Force	50												
	1.35	0.18	0.10	0.24	0.03	0.00	0.00	0.35	0.21	0.19	0.04	0.00	0.00
Not Employed, Not in Labor Force**	163												
	4.41	1.36	0.22	0.46	0.04	0.02	0.00	1.48	0.44	0.31	0.07	0.03	0.00
Total	3734	1089	166	405	46	50	7	1296	231	346	42	54	2
n and %	100.00	34.74	4.06	6.78	1.23	0.73	0.28	39.71	6.06	5.16	0.56	0.63	0.05

TABLE 15

PRESENT STATUS OF STUDENTS FROM EACH TYPE OF DELIVERY SYSTEM BY RACE/ETHNICITY & GENDER

SENIORS

(Percentage Distributions)

Status	Total n and %	MALE White	Black	Hispanic	Native American	Asian	Other	FEMALE White	Black	Hispanic	Native American	Asian	Other
					VOCATIONAL								
Postsecondary Enrollment													
2-Year*	51 20.96	11.62	1.44	1.58	0.00	0.00	0.00	2.41	3.33	0.59	0.00	0.00	0.00
4-Year	40 16.39	5.04	4.78	0.33	0.00	0.00	0.00	4.80	1.06	0.38	0.00	0.00	0.00
No Postsecondary Enrollment													
Employed	59 32.89	15.82	3.32	1.94	0.70	0.00	0.00	6.57	1.31	1.25	0.00	0.00	1.98
In Labor Force, Not Employed	75 27.37	6.86	4.64	2.26	0.00	0.03	0.00	10.18	2.42	0.71	0.00	0.25	0.00
Not Employed, Not in Labor** Force	8 2.39	..	..	..	..	..	..	..	..	..	..	..	..
Total n and %	233 100.00	45 39.34	62 15.11	20 6.11	3 0.70	1 0.03	1 0.00	25 23.95	50 8.33	23 4.19	0 0.00	1 0.25	2 1.98
					COMPREHENSIVE (Nonvocational Students)								
Postsecondary Enrollment													
2-Year*	1306 23.83	8.33	1.06	1.11	0.08	0.42	0.32	9.07	1.74	1.22	0.08	0.26	0.15
4-Year	1681 34.39	13.99	1.51	0.55	0.06	0.22	0.19	15.20	1.42	0.62	0.04	0.50	0.09

NOTE: Percentages are weighted; numbers are unweighted.

*Includes vocational technical schools and other non 4-year postsecondary institutions.

**Includes housewives and/or homemakers.

TABLE 15--Continued

Status	Total n and %	MALE White	Black	Hispanic	Native American	Asian	Other	FEMALE White	Black	Hispanic	Native American	Asian	Other
No Postsecondary Enrollment													
Employed	1010 23.54	9.70	1.31	1.38	0.08	0.06	0.39	8.59	0.94	0.87	0.07	0.07	0.07
In Labor Force, Not Employed	1270 15.20	4.21	1.14	0.91	0.06	0.01	0.15	5.76	1.27	1.31	0.05	0.06	0.27
Not Employed, Not in Labor**	170 3.03	0.70	0.39	0.15	0.03	0.01	0.04	2.96	0.46	0.12	0.04	0.02	0.00
Total n and %	5437 100.00	1223 36.93	603 5.41	595 4.10	51 0.30	103 0.73	41 1.10	1372 39.69	669 5.82	600 4.15	40 0.30	101 0.90	39 0.58
						COMPREHENSIVE (Vocational Students)							
Postsecondary Enrollment													
2-Year*	1194 25.08	9.19	0.94	1.20	0.19	0.21	0.00	9.60	1.88	1.38	0.21	0.26	0.02
4-Year	983 22.41	8.66	0.98	0.47	0.02	0.26	0.06	9.73	1.43	0.49	0.02	0.24	0.02
No Postsecondary Enrollment													
Employed	1196 31.24	12.42	1.06	2.09	0.18	0.04	0.14	12.43	1.22	1.56	0.04	0.06	0.00
In Labor Force	1117 17.65	6.42	1.02	0.82	0.05	0.02	0.01	6.98	1.04	1.19	0.06	0.07	0.06
Not Employed, Not in Labor Force**	184 3.62	1.38	0.23	0.26	0.04	0.00	0.00	1.03	0.40	0.25	0.02	0.01	0.00
Total n and %	4674 100.00	1033 38.07	458 4.23	543 4.84	54 0.48	61 0.52	9 0.21	1145 39.77	663 6.00	598 4.79	41 0.36	64 0.64	5 0.10

TABLE 16

AVERAGE HOURS AND WAGES FOR CURRENT/MOST RECENT JOB
FOR EACH TYPE OF DELIVERY SYSTEM BY RACE/ETHNICITY AND GENDER
SOPHOMORES

Race/Ethnicity & Gender	VOCATIONAL Total Employed	VOCATIONAL Average Hrs./Wk.	VOCATIONAL Average Hr. Wage	VOCATIONAL Average* Wk. Earn.	COMPREHENSIVE (Nonvocational Students) Total Employed	COMPREHENSIVE (Nonvocational Students) Average Hrs./Wk.	COMPREHENSIVE (Nonvocational Students) Average Hr. Wage	COMPREHENSIVE (Nonvocational Students) Average* Wk. Earn.	COMPREHENSIVE (Vocational Students) Total Employed	COMPREHENSIVE (Vocational Students) Average Hrs./Wk.	COMPREHENSIVE (Vocational Students) Average Hr. Wage	COMPREHENSIVE (Vocational Students) Average* Wk. Earn.
White												
Male	53	42.17	5.32	224.34	1830	37.06	5.14	186.83	988	38.15	4.99	184.15
Female	31	34.97	4.76	163.77	1918	29.97	4.50	132.17	1176	31.43	4.41	136.29
Black												
Male	24	--	--	--	312	35.81	5.07	167.29	140	37.08	4.91	174.51
Female	22	--	--	--	293	28.03	5.26	136.14	171	29.29	5.03	142.82
Hispanic												
Male	17	--	--	--	664	37.73	5.52	195.33	361	37.90	4.90	186.92
Female	19	--	--	--	530	30.95	4.54	141.35	295	31.42	5.40	149.99
Native American												
Male	2	--	--	--	53	36.60	5.12	179.78	36	43.44	5.12	220.64
Female	2	--	--	--	47	29.53	6.04	150.84	35	31.03	4.01	130.91
Asian												
Male	2	--	--	--	83	30.76	4.77	154.84	38	32.05	4.54	158.42
Female		Not observed			96	23.88	5.30	113.89	44	29.09	4.81	143.00
Other												
Male		Not observed			4	--	--	--	7	--	--	--
Female		Not observed			4	--	--	--	2	--	--	--
Total	172	38.71	5.15	199.46	5834	33.35	4.92	160.00	3293	34.40	4.79	160.67

*Average weekly earnings do not equal average hours worked multipled by average hourly wage because, in some cases only a weekly wage was available.

students. There is, however, an exception in the case of Hispanic women. The sophomore figures also differ from the senior information in another interesting way. When comparing male-female wage differences for comprehensive vocational students, black, Hispanic, and Asian women earn more per hour than their male counterparts. A female wage advantage also exists in the nonvocational group for blacks, Native Americans, and Asians. Majority white women exhibit lower hourly earnings than the other groups of women in the comprehensive nonvocational and vocational groups (with the exception of Native American women in the comprehensive vocational category). In all cases women work fewer hours per week so any hourly advantages are not translated into a weekly earnings advantage. Vocational students work more hours per week than their nonvocational counterparts, a difference reflected in generally higher weekly earnings.

Hours and Wages--Senior Cohort

Average hours worked, hourly wages, and weekly earnings for the seniors are presented in table 17. In a comparison of nonvocational and vocational students from the comprehensive high schools, a small average hourly wage advantage exists for the vocational students, a difference not observed among the sophomores. In addition, these students work more hours per week than their nonvocational counterparts as is evident in their higher weekly earnings. The single exception is in the case of Asian women. Limited numbers of those students from the vocational high school do not permit a meaningful comparison of this group. Differences between male and female wages show the usual pattern of lower hourly wages and fewer hours worked for women; however comprehensive vocational women generally show slightly higher hourly wages and hours worked when compared to the nonvocational women. The traditional difference disappears, however, for some black respondents. Black women enrolled in the comprehensive vocational program, when compared to black men in the same program, show virtually the same wages.

The difference between the two cohorts are not readily explained. They may be artifacts of sampling, but, because the same schools are the source of both cohorts, this does not appear likely. The multivariate analysis is considered next.

Multivariate Analysis

This section describes the outcomes of further analysis of the effects of the institutional delivery system. The tabular analyses just presented have described some associations between institutional characteristics, groups, and outcomes but have been unable to address the complex interrelationships that exist between institutional structures and individual behaviors. The two

TABLE 17

AVERAGE HOURS AND WAGES FOR CURRENT/MOST RECENT JOB
FOR EACH TYPE OF DELIVERY SYSTEM BY RACE/ETHNICITY AND GENDER
SENIORS

Race/Ethnicity & Gender	VOCATIONAL				COMPREHENSIVE (Nonvocational Students)				COMPREHENSIVE (Vocational Students)			
	Total Employed	Average Hrs./Wk.	Average Hr. Wage	Average* Wk. Earn.	Total Employed	Average Hrs./Wk.	Average Hr. Wage	Average* Wk. Earn.	Total Employed	Average Hrs./Wk.	Average Hr. Wage	Average* Wk. Earn
White												
Male	19	..	..	..	696	40.70	6.34	257.49	554	42.72	6.28	261.70
Female	15	..	..	..	794	35.38	5.39	190.28	676	36.14	5.70	204.17
Black												
Male	29	39.24	5.85	221.80	290	39.37	5.86	233.65	228	39.75	6.14	229.05
Female	20	..	..	..	287	33.24	5.69	189.35	310	34.07	6.13	196.43
Hispanic												
Male	12	..	..	..	302	40.54	6.24	251.07	287	41.25	6.95	270.71
Female	11	..	..	..	310	35.18	6.13	191.08	311	37.14	6.11	211.57
Native American												
Male	Not observed				29	40.17	4.96	196.81	23	..	..	..
Female	Not observed				17	..	..	..	18	..	..	..
Asian												
Male	Not observed				51	32.71	5.80	184.67	34	34.85	6.96	191.26
Female	Not observed				54	28.67	9.31	232.69	38	33.00	5.02	166.56
Other												
Male	Not observed				11	..	..	..	5	..	..	..
Female	Not observed				7	..	..	..	2	..	..	..
Total	106	38.39	7.17	254.25	2848	37.77	5.96	217.75	2486	38.43	6.13	227.41

*Average weekly earnings do not equal average hours worked multiplied by average hourly wage because in some cases only a weekly wage was available.

postsecondary outcomes, earnings, and further education are presented first. Some of the occurrences within the educational experience that have had apparent effects on these outcomes are then examined. Also considered are these outcomes from the standpoint of individuals and institutions. In the latter case, the outcomes are institutional averages.

The data are limited with respect to the area vocational schools, but some information is available from the senior cohort of HS&B. These data are included in the appropriate regressions. Ordinary least squares (OLS) is the most frequent form of analysis, but probit analyses are also presented where the dependent variables are dichotomies.

Wages and Earnings

The earnings equations were estimated in log form, following standard practice in econometrics. This permits the coefficients to be interpreted as percentage change associated with the explanatory variables.

For the HS&B sophomore cohort, there is no observable effect on wages or monthly earnings associated with attending a full-time vocational high school (table 18). The coefficient is positive, suggesting that the graduates of these high schools have an advantage, but the magnitude is too small for the number of cases to rule out the possibility that it may be a mere artifact of sampling. On the other hand, the availability of an area vocational school is associated with a small but significant disadvantage in wages and monthly earnings. Unfortunately, it is not known whether the vocational graduates who attended the high schools in the HS&B sample took their vocational training at their home school or at the area school. Therefore it is not possible to conclude from these data that programs delivered in specialized vocational schools are better or worse than vocational programs delivered in comprehensive high schools. Given this fact, and considering the known advantage in wages and earnings for those who concentrate in a vocational specialty and work in a training-related job, it appears that both types are effective delivery systems.

The results for the senior cohort are comparable (table 19). Here the coefficient for full-time vocational schools is also positive, but not sufficiently large to be accepted as a nonchance value. Respondents in the senior cohort also reported whether they had taken their vocational courses away from the home school. It is a reasonable assumption that these courses were taken in area vocational schools. The effect on wages of this type of course taking was very slightly negative and nonsignificant. The conclusion remains that there is no evidence supporting differential effectiveness among the three types of schools, although

TABLE 18

FACTORS INFLUENCING HOURLY AND MONTHLY WAGES
INDIVIDUALS
(Sophomores)

Variable	Hourly Wage		Monthly Wage		
	Parameter Estimate	t-value	Parameter Estimate	t-value	n
Intercept	1.316	14.265	6.667	47.164	5131
School Characteristics					
Vocational	0.048	0.874	0.085	1.001	61
Area vocational school available	-0.027*	-2.104	-0.048*	-2.428	3376
School size					
1. 0-49	-0.062*	-2.245	-0.030	-0.724	301
2. 50-99	0.008	0.353	0.051	1.399	450
3. 100-199	0.013	0.758	0.025	0.970	1197
4. 200-299	0.015	0.888	0.016	0.594	1084
5. 300-499	Reference Group		Reference Group		
6. 500-749	0.110	0.492	0.003	0.096	605
7. 750-1499	0.113*	2.908	0.115	1.924	126
Education					
Concentrator	0.011	0.492	0.049	1.387	585
Limited Concentrator	-0.041*	-2.354	-0.031	-1.151	949
Concentrator/Explorer	-0.048*	-2.260	-0.001	-0.029	569
Concentrator(TR)	0.108*	2.864	0.165*	2.866	110
Limited Concentrator(TR)	0.128*	3.940	0.145*	2.925	129
Concentrator/Explorer(TR)	0.117*	2.731	0.198*	3.026	72
Academic	-0.013	-0.307	-0.100	-1.555	106
SR Academic	0.009	0.632	0.024	1.098	2046
SR Vocational	0.013	0.744	0.026	0.963	840
Personal Characteristics					
Male					
Hispanic	0.026	1.155	-0.030	-0.863	491
Black	-0.012	-0.418	-0.089*	-2.004	259
Native American	-0.034	-0.505	-0.163	-1.579	39
Asian	-0.021	-0.368	-0.072	-0.829	57
Other	0.448	1.865	0.644	1.750	3
Female					
Hispanic	-0.039	-1.612	-0.242*	-6.535	442
Black	-0.046	-1.472	-0.280*	-5.918	240
Native American	-0.108	-1.567	-0.233*	-2.206	38
White	-0.079*	-5.210	-0.271*	-11.704	1757
Asian	0.056	0.966	-0.424*	-4.764	55
Other	-0.143	-0.484	-0.443	-0.979	2
R^2	0.0662		0.1904		
Adj. R^2	0.0558		0.1813		
F-statistic	6.315		20.934		

NOTE: SR refers to self-report, MD refers to missing data, TR refers to training-related placement.

*Indicates that the chance probability of an effect this large is $\leq .05$.

TABLE 18--Continued

Variable	Hourly Wage Parameter Estimate	Hourly Wage t-value	Monthly Wage Parameter Estimate	Monthly Wage t-value	n
Achievement					
Verbal	-0.001	-0.587	-0.003	-1.782	5131
Math	0.001	0.730	0.000	0.225	5131
Civics	-0.001	-1.107	-0.000	-0.165	5131
Science	-0.001	-0.845	-0.002	-1.222	5131
SES	0.030*	2.567	0.056*	3.162	5131
Work value	0.095*	3.888	0.081*	2.171	5018
MD work value	0.077	1.358	0.068	0.782	113
Self-esteem	0.010	1.008	0.024	1.518	4981
MD self-esteem	-0.051	-1.031	-0.086	-1.130	151
Absenteeism	0.003	1.954	0.005	1.908	5131
High school dropout	0.019	0.737	-0.040	-1.010	360
Work in high school 1-250 hours	-0.016	-0.692	-0.055	-1.548	484
Work in high school 251-500 hours	0.034	1.770	0.018	0.612	935
Work in high school 501 hours or more	0.043*	2.766	0.141*	5.856	2656
MD work in high school	-0.010	-0.311	-0.024	-0.488	188
Average grades	-0.009	-0.945	-0.029	-1.917	5107
MD average grades	-0.072	-0.844	-0.119	-0.910	24
Community Characteristics					
Northeast	0.037*	2.241	0.078*	3.105	1258
South	0.018	1.097	0.071*	2.822	1460
West	0.099*	5.346	0.139*	4.899	909
Rural	-0.035	-1.638	0.008	0.234	778
MD rural	-0.022	-1.147	-0.051	-1.705	546
Urban	-0.003	-0.190	0.006	0.260	2815
Community unemployment rate	-0.008*	-3.295	-0.013*	-3.442	5131
Educational Outcomes					
Ever enrolled in postsecondary	0.022	1.278	-0.013	-0.480	3345
Currently enrolled in postsecondary	-0.067*	-4.098	-0.404*	-16.214	2289
MD postsecondary	-0.194	-1.913	-0.177	-1.143	17

TABLE 19

FACTORS INFLUENCING HOURLY AND MONTHLY WAGES
INDIVIDUALS
SENIORS

Variable	Hourly Wage		Monthly Wage		
	Parameter Estimate	t-value	Parameter Estimate	t-value	n
Intercept	1.528	15.403	6.962	50.336	4855
School Characteristics					
Vocational	0.081	1.583	0.072	1.003	85
Classes taken away from home school	-0.007	-0.399	-0.015	-0.560	758
MD classes taken away from home school	-0.033	-0.469	-0.014	-0.147	43
School Size					
1. 0-49	-0.031	-0.819	-0.018	-0.336	180
2. 50-99	-0.054	-1.915	-0.042	-1.081	352
3. 100-199	0.003	0.130	0.026	0.875	811
4. 200-299	-0.003	-0.167	0.030	1.125	941
5. 300-499	Reference Group				
6. 500-749	0.043*	2.170	0.069*	2.511	832
7. 750-1499	0.108*	3.083	0.171*	3.495	196
8. MD school size	-0.022	-0.864	0.011	0.339	375
Education					
SR academic	0.025	1.441	-0.019	-0.796	1795
SR vocational	0.062*	3.288	0.075*	2.840	1105
Remedial English	-0.034	-1.736	-0.019	-0.691	1381
MD remedial English	-0.106	-1.258	-0.114	-0.972	80
Remedial math	-0.022	1.079	0.007	0.263	1350
MD remedial math	0.165*	1.985	0.160	1.380	82
Advanced algebra	-0.005	-0.273	-0.010	-0.415	2421
MD advanced algebra	-0.042	-1.141	-0.051	-0.998	165
Personal Characteristics					
Male					
Hispanic	0.023	0.898	-0.015	-0.420	559
Black	-0.087*	-3.099	-0.160*	-4.101	473
Native American	-0.043	-0.662	-0.119	-1.312	53
Asian	-0.012	-0.223	-0.113	-1.472	76
Other	0.377	1.640	0.604	1.883	4
Female					
Hispanic	-0.108*	-4.062	-0.320*	-8.639	558
Black	-0.207*	-7.568	-0.462*	-12.135	537
Native American	-0.112	-1.521	-0.286*	-2.802	41
White	-0.116*	-6.068	-0.289*	-10.863	1320
Asian	-0.076	-1.284	-0.425*	-5.145	67
Other	-0.342	-1.055	-0.577	-1.276	2
R^2 =	0.0681		0.1976		
Adj. R^2 =	0.0578		0.1887		
F-statistic =	6.621		22.303		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates that the chance probability of an effect this large is $\leq .05$.

TABLE 19--Continued

Variable	Hourly Wage		Monthly Wage		
	Parameter Estimate	t-value	Parameter Estimate	t-value	n
Achievement-40th Grade					
Verbal	-0.002	-1.697	-0.004	-2.403	4855
Math	0.001	1.001	0.001	0.574	4855
SES	0.037*	3.292	0.019	1.206	4855
Work value	0.039	1.842	0.057	1.910	4774
MD work value	-0.070	-0.870	0.054	0.483	81
Self-esteem	0.021	1.835	0.013	0.822	4758
MD self-esteem	-0.010	-0.139	-0.124	-1.196	97
Absenteeism	0.003	1.578	0.002	0.955	4855
Average grades	0.018	1.495	-0.023	-1.369	4837
MD average grades	0.249*	2.299	0.310*	2.051	18
College aspiration - Y	-0.008	-0.458	-0.011	-0.452	2543
College aspiration - N	-0.018	-0.882	0.002	0.071	883
MD college aspiration	0.001	0.028	0.030	-0.616	230
Community Characteristics					
Northeast	0.043*	2.030	0.046	1.554	842
South	0.042*	2.252	0.065*	2.479	1849
West	0.098*	4.572	0.099*	3.332	1004
Rural	-0.022	-0.898	-0.088*	-2.558	665
MD rural	0.065	1.728	0.134*	2.550	152
Urban	-0.005	-0.284	-0.053*	-2.215	3099
Community unemployment rate	-0.010*	-3.706	-0.014*	-3.594	4855
Educational Outcomes					
Ever enrolled in postsecondary	-0.032	-1.931	-0.076*	-3.308	2826
Currently enrolled in postsecondary	-0.115*	-6.399	-0.422*	-16.868	1658
Labor Market Outcomes					
Voc ed program-related placement	0.086*	2.387	0.102*	2.039	4448
MD voc ed program-related placement	-0.056*	-2.348	-0.149*	-4.499	407

there is a small element of doubt regarding the area vocational schools.

There are several other school-related effects worth noting. School size is somewhat associated with wages and earnings, with small schools having a small disadvantage and large schools having an advantage. Both region and urbanicity were controlled, thereby suggesting that something within the school, rather than its location, caused the effect. Score on a work values scale was always positive and significant in the sophomore cohort. Neither grades nor test scores showed associations with wages and earnings, raising questions about the validity of the widespread employers' claim that their primary need is to have workers with proficiency in basic skills. The argument that the brighter students may not be working but are attending postsecondary school was addressed by controlling for postsecondary attendance. The results cannot, therefore, be attributed to that possibility.

Postsecondary Attendance

The affects the type of school has on postsecondary attendance is considered next (table 20). The results are contrary to expectations. Status attainment theory suggests that persons who are encouraged by their parents and their peers to attend vocational schools are less likely to continue their education in postsecondary schools. Likewise, human capital theory suggests that individuals will recoup the schooling investment as soon as this investment is mature enough to begin to pay off, unless further schooling investment enhances, rather than replaces, the completed investment. Therefore, vocational school graduates are expected to be found more often in the labor market than in postsecondary schools. In actuality, there are no patterns of association between institutional type and postsecondary attendance. The structural concepts that predict continuing formal education are primarily characteristics of individuals rather than institutions. However, the impacts of the individual characteristics are undoubtedly influenced by forces that operate within the institutions. The suggestion is that the forces are similar across institutional types. The variables that refer to the structural concepts that influence postsecondary attendance include the individuals' perception of their curricula, but not the actual courses taken except for advanced algebra and for very small effects for vocational specialities. These latter are positive indicators for business students and negative indicators for agriculture and trade and industry students. Other variables that influence postsecondary attendance are college aspiration, average grades, and test scores. These variables operate in the expected direction: They are positive indicators of postsecondary attendance in every case except for non-college aspirants. Socioeconomic status shows an effect that is independent of curriculum and school success (these are controlled).

TABLE 20

FACTORS INFLUENCING ATTENDANCE AT POSTSECONDARY INSTITUTIONS
INDIVIDUALS

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Intercept	-0.386	-4.855	6164	-0.264	-3.248	7031
School Characteristics						
Vocational	-0.024	-0.515	87	0.010	0.239	144
Area vocational school available	-0.010	-0.793	4438			
Classes taken away from home school				0.001	0.052	1146
MD classes taken away from home school				-0.035	-0.641	73
School Size						
1. 0-49	-0.012	-0.455	313	-0.055	-1.793	272
2. 50-99	-0.035	-1.494	437	-0.012	-0.506	504
3. 100-199	-0.031	-1.828	1078	-0.049*	-2.807	1151
4. 200-299	-0.013	-0.836	1246	-0.028	-1.745	1400
5. 300-499		Reference Group			Reference Group	
6. 500-749	0.012	0.718	928	0.015	0.914	1206
7. 750-1499	0.039	1.232	188	0.066*	2.250	283
Education						
Concentrator	0.004	0.157	764			
Limited Concentrator	0.036*	2.196	1110			
Concentrator/ Explorer	0.052*	3.018	778			
Academic	0.085	1.686	72			
SR Academic	0.079*	5.865	1985	0.080*	5.518	2505
SR Vocational	-0.026	1.699	1173	-0.053*	-3.609	1684
Specialty						
Agriculture	-0.010	-1.294	6164			
Business	0.011*	2.541	6164			
Health	-0.003	-0.182	6164			
Occupational home economics	0.020	1.889	6164			
Trade & industry	-0.015*	-3.765	6164			
Distributive ed.	0.007	0.670	6164			
Remedial English				-0.023	-1.429	2001
MD remedial English				-0.064	-0.922	133
Remedial math				-0.015	-0.894	1993
MD remedial math				0.052	0.769	139
Advanced algebra				0.099*	7.070	3352
MD advanced algebra				0.037	1.253	257
R^2 =	0.2864			0.2487		
Adj. R^2 =	0.2805			0.2435		
F-statistic =	49.057			48.152		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates that the chance probability of an effect this large is $\leq .05$.

TABLE 20--Continued

Variable	Sophomore Parameter Estimate	Sophomore t-value	Sophomore n	Senior Parameter Estimate	Senior t-value	Senior n
Personal Characteristics						
Male						
Hispanic	0.045*	2.225	633	0.014	0.628	779
Black	0.105*	3.855	298	0.065*	2.784	698
Native American	0.153*	3.027	72	-0.012	-0.221	74
Asian	0.142*	3.092	89	0.086	1.891	114
Other	0.204	0.849	3	0.267	1.161	4
Female						
Hispanic	0.110*	5.047	595	0.045*	2.043	842
Black	0.240*	9.208	378	0.096*	4.401	947
Native American	0.027	0.499	64	0.077	1.275	61
White	0.004	0.243	2055	-0.016	-0.984	1835
Asian	0.078	1.616	82	0.070	1.483	106
Other	0.724*	2.451	2	0.338	1.472	4
Achievement--10th grade						
Verbal	0.004*	3.680	6164	0.002	1.769	7031
Math	0.004*	4.863	6164	0.007*	6.892	7031
Civics	0.002*	2.990	6164			
Science	0.003*	3.075	6164			
SES	0.157*	15.525	6164	0.082*	9.018	7031
Work value	0.028	1.327	6012	0.017	0.970	6917
MD work value	0.107*	2.166	152	0.025	0.380	114
Self-esteem	0.005	0.579	5975	0.009	0.941	6892
MD self-esteem	-0.093*	-2.077	189	-0.039	-0.693	139
Absenteeism	-0.007*	-5.255	6164	-0.003*	-2.534	7031
Average grades	0.095*	11.071	6137	0.075*	7.715	7001
MD average grades	-0.033	-0.403	27	-0.062	-0.736	30
College aspiration-Y				0.096*	6.757	3601
College aspiration-N				-0.111*	-6.443	1302
MD college aspiration				0.032	1.166	361
Community Characteristics						
Northeast	-0.023	-1.399	1256	-0.030	-1.736	1254
South	-0.047*	-3.178	2013	-0.039*	-2.496	2734
West	0.026	1.515	1171	0.031	1.728	1370
Rural	-0.026	-1.316	1161	-0.040	-1.957	990
MD rural	0.060*	3.507	724	0.051	1.658	230
Urban	0.007	0.450	3249	0.059*	4.077	4475
Community unemployment rate	-0.007*	-3.097	6164	0.001	0.399	7031

Although OLS is a robust technique, some of its assumptions do not hold when the dependent variable is dichotomous; for example, college attendance. Therefore the equation for college attendance was reestimated using the probit form of maximum likelihood. This procedure presents some complexity in interpretation, depending upon the point at which one chooses to evaluate the results, because the function is nonlinear. Table 21 presents the results of this analysis with the effects of each independent variable represented as the change in the probability of college attendance associated with that variable when all others are held to their average values. The OLS results are confirmed and, in general, the effects are even stronger under the probit assumptions. We now turn to analyses of some of the in-school concepts that either influenced the labor market or postsecondary outcomes or behaved in unexpected ways.

Twelfth-Grade Test Scores

Recall that test scores were associated with postsecondary attendance, but not with wages and earnings. Tables 22 and 23 present the results for the verbal and math tests, respectively. The results are consistent across tests but not across cohorts. In other words, both tests given to those who attended the full-time vocational high schools show positive coefficients for the senior cohort and negative coefficients for the sophomore cohort.

None of the negative coefficients approach significance, however, and the estimated effect that attending vocational high schools has on math is significant and positive. The weight of the evidence, then, favors the full-time vocational high schools as equally good places to learn basic skills, although the consistent small, albeit nonsignificant, negative effect for the sophomore cohort renders this conclusion most tentative.

The available data for the senior cohort in the area vocational schools is not as promising. In both the math and verbal equations, the estimated effect of attending an area school is both negative and unlikely to be an artifact of sampling. This statement must be interpreted with caution. Whether the students did not learn as much language and math because they attended area vocational schools or whether their skills in these areas were simply much lower to begin with cannot be determined from this analysis. Other studies with the sophomore cohort have suggested that the latter is true (see Weber [1986] and Campbell et al. [1986]). However, if one assumes that more rigorous courses are not taught to those who attend area schools, either there or at the home school, then an institutional effect is certainly possible. This issue cannot be resolved with the present analysis, but

TABLE 21

FACTORS INFLUENCING ATTENDANCE AT POSTSECONDARY INSTITUTIONS
INDIVIDUALS

PROBIT ANALYSIS

	Sophomore			Senior		
	Coefficient	t-value	Effect	Coefficient	t-value	Effect
School Characteristics						
Vocational	-0.070	-0.447	-0.0268	0.020	0.172	0.0078
Area vocational school available	-0.070	-1.704	-0.0266			
Classes taken away from home school				-0.040	-0.868	-0.0155
MD classes taken away from home school				-0.101	-0.612	-0.0396
School Size						
1. 0-49	-0.103	-1.153	-0.0395	-0.224*	-2.404	-0.0885
2. 50-99	-0.139	-1.770	-0.0538	-0.066	-0.933	-0.0260
3. 100-199	-0.126*	-2.222	-0.0483	-0.180*	-3.363	-0.0708
4. 200-299	-0.081	-1.555	-0.0310	-0.121*	-2.504	-0.0474
5. 300-499	Reference Group			Reference Group		
6. 500-749	0.010	0.165	0.0037	0.030	0.587	0.0116
7. 750-1499	0.102	0.905	0.0379	0.101	1.109	0.0388
Education						
Concentrator	0.027	0.342	0.0102			
Limited Concentrator	0.086	1.582	0.0324			
Concentrator/Explorer	0.154*	2.626	0.0575			
Academic	0.656*	2.480	0.2108			
SR Academic	0.339*	7.258	0.1255	0.338*	7.744	0.1297
SR Vocational	-0.097*	-1.965	-0.0372	-0.144*	-3.374	-0.0565
Specialty						
Agriculture	-0.036	-1.419	-0.0137			
Business	0.021	1.429	0.0079			
Health	-0.015	-0.287	-0.0057			
Occupational home economics	0.042	1.190	0.0158			
Trade & industry	-0.059*	-4.481	-0.0222			
Distributive ed.	0.011	0.346	0.0043			
Remedial English				-0.134*	-2.822	-0.0526
MD remedial English				-0.110	-0.533	-0.0431
Remedial math				-0.076	-1.572	-0.0299
MD remedial math				0.097	0.483	0.0372
Advanced algebra				0.291*	7.138	0.1129
MD advanced algebra				0.066	0.759	0.0254

NOTES: SR refers to self-report, MD refers to missing data. The probit effect estimates are evaluated around the mean of the latent probit variable. For the curriculum index, the effects are instantaneous effects evaluated at the mean of the latent probit variable. Effects of the dichotomous vocational profile variables are evaluated by subtracting predicted value with the profile variable set to 0 from the predicted value with the profile variable set to 1.0, and all other independent variables set to their means.

*Indicates that the chance probability of an effect this large is $\leq .05$.

TABLE 21--Continued

	Sophomore			Senior		
	Coefficient	t-value	Effect	Coefficient	t-value	Effect
Personal Characteristics						
Male						
Hispanic	0.075	1.127	0.0282	-0.039	-0.588	-0.0151
Black	0.222*	2.476	0.0810	0.093	1.344	0.0359
Native American	0.422*	2.577	0.1458	-0.098	-0.592	-0.0383
Asian	0.586*	3.148	0.1927	0.348*	2.110	0.1278
Other	0.319	0.410	0.1136	0.758	1.220	0.2491
Female						
Hispanic	0.241*	3.342	0.0875	-0.033	-0.511	-0.0128
Black	0.711*	7.804	0.2241	0.149*	2.317	0.0572
Native American	-0.029	-0.169	-0.0110	0.134	0.754	0.0512
White	-0.109*	-2.112	-0.0415	-0.168*	-3.337	-0.0658
Asian	0.202	1.080	0.0739	0.225	1.342	0.0847
Other	4.218	0.373	0.3770	3.123	0.399	0.4129
Achievement--10th grade						
Verbal	0.008*	2.226	0.0032	-0.004	-1.466	-0.0016
Math	0.009*	3.085	0.0035	0.014*	5.182	0.0056
Civics	0.004	1.812	0.0016			
Science	0.004	1.491	0.0016			
SES	0.580*	16.517	0.2202	0.264*	9.419	0.1027
Work value	-0.410*	-7.240	-0.1558	-0.249*	-5.650	-0.0968
MD work value	0.319	1.930	0.1213	0.085	0.438	0.0333
Self-esteem	-0.103*	-3.485	-0.0391	-0.063*	-2.306	-0.0245
MD self-esteem	-0.368	-2.428	-0.1397	-0.071	-0.396	-0.0277
Absenteeism	-0.029*	-6.407	-0.0110	-0.014*	-3.404	-0.0054
Average grades	0.326*	11.216	0.1237	0.247*	8.323	0.0961
MD average grades	-0.212	-0.780	-0.0806	-0.263	-1.065	-0.1026
College aspiration - Y				0.294*	7.097	0.1144
College aspiration - N				-0.398*	-7.852	-0.1571
MD college aspiration				-0.022	-0.273	-0.0086
Community Characteristics						
Northeast	-0.142*	-2.558	-0.0547	-0.167*	-3.063	-0.0656
South	-0.239*	-4.838	-0.0917	-0.230*	-4.906	-0.0898
West	0.026	0.442	0.0098	-0.002	-0.035	-0.0008
Rural	-0.204*	-2.972	-0.0785	-0.212*	-3.441	-0.0836
MD rural	0.146*	2.572	0.0545	0.031	0.336	0.0119
Urban	-0.076	-1.386	-0.0287	0.133*	3.035	0.0519
Community unemployment rate	-0.038*	-5.410	-0.0146	-0.025*	-3.680	-0.0091

TABLE 22

FACTORS INFLUENCING 12TH GRADE VERBAL SCORES
INDIVIDUALS

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Intercept	9.371	10.348	5706	44.750	84.831	8121
School Characteristics						
Vocational	-0.427	-0.803	80	0.731	1.363	159
Area vocational school available	-0.087	-0.622	4115			
Classes taken away from home school				-1.937*	-9.775	1365
MD classes taken away from home school				-1.272	-1.822	89
School Size						
1. 0-49	-0.746*	-2.484	302	-0.751	-1.813	273
2. 50-99	-0.512	-1.886	387	-0.430	-1.338	495
3. 100-199	0.094	0.496	1027	-0.036	-0.153	1164
4. 200-299	-0.359*	-2.070	1178	-0.466*	-2.181	1423
5. 300-499	Reference Group			Reference Group		
6. 500-749	0.357	1.853	842	0.324	1.445	1209
7. 750-1499	0.163	0.449	174	-0.534	-1.392	306
8. MD school size				-0.298	-1.341	996
Education						
Concentrator	0.120	0.441	709			
Limited Concentrator	0.147	0.794	1031			
Concentrator/Explorer	0.421*	2.144	718			
Academic	0.409	0.732	70			
SR Academic	0.365*	2.375	1875	2.300*	12.215	2849
SR Vocational	-0.794*	-4.585	1080	-0.788*	-4.137	1989
Specialty						
Agriculture	-0.143	-1.577	5706			
Business	0.081	1.632	5706			
Health	-0.030	-0.165	5706			
Occupational home economics	0.215	1.767	5706			
Trade & industry	-0.118*	-2.529	5706			
Distributive ed.	0.038	0.321	5706			
Remedial English				-0.867*	-4.136	2351
MD remedial English				0.950	1.039	157
Remedial math				-0.867*	-4.046	2344
MD remedial math				-1.492	-1.655	162
Advanced algebra				2.146*	12.252	3799
MD advanced algebra				-0.540	-1.386	301
R^2	0.7703			0.4756		
Adj. R^2	0.7683			0.4728		
F-statistic	379.275			170.335		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates the chance probability of an effect this large is $\leq .05$.

TABLE 22--Continued

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Personal Characteristics						
Male						
Hispanic	-0.416	-1.823	583	-5.184*	-18.741	935
Black	0.134	0.439	285	-5.877*	-20.349	854
Native American	-0.064	-0.110	65	-2.386*	-3.295	86
Asian	-1.044*	-2.023	85	-4.957*	-8.286	131
Other	-3.465	-1.318	3	-4.687*	-2.149	9
Female						
Hispanic	-0.267	-1.075	557	-6.470*	-23.440	982
Black	-0.145	-0.490	335	-7.260*	-27.160	1092
Native American	-0.970	-1.557	57	-4.292*	-5.340	69
White	0.033	0.193	1905	-1.198*	-5.612	2026
Asian	-1.152*	-2.099	76	-5.529*	-9.201	132
Other	-3.023	-0.937	2	-2.004	-0.753	6
Achievement--10th grade						
Verbal	0.649*	49.901	5706			
Math	0.083*	8.148	5706			
Civics	0.038*	4.808	5706			
Science	0.095*	9.795	5706			
SES	0.723*	6.270	5706	0.732*	6.142	8121
Work value	-0.617*	-2.544	5560			
MD work value	-1.576*	-2.864	146			
Self-esteem	-0.008	-0.080	5528			
MD self-esteem	-0.062	-0.124	178			
Absenteeism	0.010	0.658	5706	0.064*	3.625	8121
Average grades	0.933*	9.521	5680	3.104*	25.696	8121
MD average grades	-1.225	-1.358	26			
College aspiration - Y				0.788*	4.226	4085
College aspiration - N				-1.181*	-5.285	1547
MD college aspiration				-2.673*	-8.038	428
Community Characteristics						
Northeast	0.328	1.807	1190	-0.644*	-2.746	1431
South	-0.184	-1.101	1888	-1.693*	-8.271	3174
West	0.424*	2.160	1039	-0.469*	-1.982	1629
Rural	-0.060	-0.266	1080	-1.655*	-5.957	1061
MD rural	-0.288	-1.464	648	-0.715*	-2.982	832
Urban	0.057	0.322	3028	-0.614*	-3.107	4794
Community unemployment rate	-0.027	-1.117	5706	-0.098*	-3.268	8121

TABLE 23

FACTORS INFLUENCING 12TH GRADE MATH SCORES
INDIVIDUALS

Variable	Sophomore Parameter Estimate	Sophomore t-value	Sophomore n	Senior Parameter Estimate	Senior t-value	Senior n
Intercept	10.408	9.549	5706	43.473	81.670	8006
School Characteristics						
Vocational	-0.539	-0.841	80	1.452*	2.696	159
Area vocational school available	-0.295	-1.750	4115			
Classes taken away from home school				-1.815*	-9.043	1341
MD classes taken away from home school				-0.031	-0.043	85
School Size						
1. 0-49	-0.287	-0.795	302	-0.884*	-2.111	270
2. 50-99	-1.200*	-3.676	387	-0.763*	-2.353	490
3. 100-199	-0.215	-0.943	1027	0.083	0.349	1137
4. 200-299	0.018	0.085	1178	-0.050	-0.233	1395
5. 300-499		Reference Group			Reference Group	
6. 500-749	0.361	1.560	842	0.622*	2.745	1185
7. 750-1499	0.366	0.837	174	-0.230	-0.587	297
8. MD school size				0.268	1.191	978
Education						
Concentrator	-0.249	-0.757	709			
Limited Concentrator	0.223	1.001	1031			
Concentrator/Explorer	0.686*	2.905	718			
Academic	2.411*	3.583	70			
SR Academic	0.690*	3.733	1875	2.494*	13.101	2814
SR Vocational	-0.245	-1.175	1080	-0.721*	-3.737	1949
Specialty						
Agriculture	-0.220	-1.830	5706			
Business	-0.197*	-3.287	5706			
Health	-0.542*	-2.489	5706			
Occupational home economics	-0.376*	-2.567	5706			
Trade & industry	-0.157*	-2.795	5706			
Distributive ed.	0.006	0.046	5706			
Remedial English				0.103	0.485	2320
MD remedial English				-0.688	-0.737	153
Remedial math				-2.174*	-10.038	2320
MD remedial math				-1.499	-1.627	158
Advanced algebra				5.082*	28.647	3753
MD advanced algebra				-1.688*	-4.273	294
R^2 =	0.7111			0.5632		
Adj. R^2 =	0.7086			0.5609		
F-statistic =	278.433			238.759		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates that the chance probability of an effect this large is $\leq .05$.

TABLE 23--Continued

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Personal Characteristics						
Male						
Hispanic	-0.510	-1.856	583	-4.560*	-16.328	921
Black	-0.348	-0.949	285	-6.401*	-21.904	840
Native American	0.099	0.142	65	-3.972	-5.459	86
Asian	0.791	1.273	85	-1.026	-1.708	131
Other	-5.364	-1.695	3	-4.630*	-2.114	9
Female						
Hispanic	-1.719*	-5.749	557	-7.712*	-27.578	954
Black	-1.368*	-3.849	355	-8.754*	-32.307	1068
Native American	-1.923*	-2.566	57	-6.262*	-7.708	68
White	-1.458*	-6.997	1905	-3.282*	-15.250	2004
Asian	-1.623*	-2.458	76	-4.770*	-7.800	128
Other	4.974	1.281	2	-0.431	-0.147	5
Achievement--10th grade						
Verbal	0.177*	11.272	5706			
Math	0.570*	46.335	5706			
Civics	-0.012	-1.225	5706			
Science	0.086*	7.339	5706			
SES	0.645*	4.645	5706	0.361*	2.996	8006
Work value	-0.534	-1.831	5560			
MD work value	-0.995	-1.503	146			
Self-esteem	-0.130	-1.029	5528			
MD self-esteem	0.168	0.278	178			
Absenteeism	-0.050*	-2.662	5706	-0.020	-1.145	8006
Average grades	1.579*	13.382	5680	3.266*	26.791	8006
MD average grades	-1.739	-1.601	26			
College aspiration - Y				1.427*	7.569	4036
College aspiration - N				-0.689*	-3.048	1527
MD college aspiration				-2.908*	-8.621	419
Community Characteristics						
Northeast	0.229	1.048	1190	-1.266*	-5.325	1396
South	-0.620*	-3.084	1888	-2.185*	-10.562	3142
West	-0.168	-0.711	1039	-0.638*	-2.668	1592
Rural	-0.402	-1.468	1081	-0.634*	-2.255	1048
MD rural	0.133	0.560	648	-0.694*	-2.852	814
Urban	-0.358	-1.684	3028	-0.418*	-2.090	4736
Community unemployment rate	-0.032	-1.077	5706	-0.112*	-3.687	8006

some indications suggest that both of the explanations may be operating. Judgment on this issue must remain tentative pending further inquiry.

Absenteeism

The results from a study of absenteeism show one clear finding (table 24): those who attend vocational classes away from the home school, presumably at area vocational schools, report higher rates of absenteeism. The full-time vocational high schools do not appear to differ from the comprehensive high schools. The specification does not explain absenteeism well, but, unless there is a variable missing that is associated positively with both area school attendance and being absent frequently, the findings represent a reasonable estimate. The two prime candidates for such an association, socioeconomic status and academic ability, are both proxied by included variables. Some speculations about the possible explanations for the higher rate of absenteeism are presented in the concluding chapter.

Dropping Out

Limitations of the database confined the analysis of dropping out to the sophomore cohort only (table 25). Although there may have been some senior cohort dropouts, they would have had to drop out in the last 3 months before graduation; otherwise they would not have been in the sample. The dropouts from the sophomore cohort however, were, followed up with a special survey. The expected associations with dropping out are observed in this sample. In addition, the full-time vocational high school has a higher dropout rate than the comprehensive high school. Unfortunately, the area vocational students are not identified in this cohort, and, for this reason, their dropout rate cannot be determined. The institutionally related variables that should be noted are grades, absenteeism, and self-perception of curriculum. Those who have lower grades, have higher absenteeism, and see themselves as vocational students are more likely to drop out. Actual vocational courses taken do not support the notion of a higher dropout rate for vocational students. As specified in this equation, they produce an inflated estimate, because the longer students remain in school, the more courses they have the opportunity to take. Because dropping out is a dichotomous variable, a probit equation was estimated (table 26). It confirmed the results of the OLS equation in most respects, but was in general more conservative in the effects estimates.

TABLE 24

FACTORS AFFECTING NONILLNESS ABSENTEEISM

INDIVIDUALS

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Intercept	4.682	5.595	5256	5.896	8.556	7726
School Characteristics						
Vocational	-0.487	-0.972	67	0.105	0.302	152
Area vocational school available	0.054	0.434	3779			
Classes taken away from home school				0.287*	2.207	1276
MD classes taken away from home school				1.744*	3.621	74
School size						
1. 0-49	0.058	0.209	255	-0.028	-0.105	257
2. 50-99	-0.176	-0.722	359	0.251	1.217	477
3. 100-199	-0.158	-0.929	912	0.277	1.815	1107
4. 200-299	-0.089	-0.575	1063	0.212	1.531	1338
5. 300-499		Reference Group			Reference Group	
6. 500-749	0.273	1.608	796	0.249	1.727	1157
7. 750-1499	0.457	1.430	165	-0.165	-0.650	227
8. MD school size				0.403*	2.792	940
Education						
Concentrator	0.141	0.605	763			
Limited Concentrator	0.056	0.360	1110			
Concentrator/Explorer	0.109	0.634	695			
Academic	0.156	0.330	72			
SR Academic	-0.230	-1.735	1901	-0.493*	-4.006	2751
SR Vocational	0.414*	2.579	924	-0.308*	-2.479	1851
Specialty						
Agriculture	0.009	0.121	5256			
Business	-0.134*	-3.087	5256			
Health	0.090	0.588	5256			
Occupational home economics	0.051	0.492	5256			
Trade & industry	-0.005	-0.121	5256			
Distributive ed.	0.109	1.134	5256			
Remedial English				0.278*	2.046	2237
MD remedial English				-0.457	-0.748	137
Remedial math				-0.128	-0.915	2221
MD remedial math				0.304	0.506	142
Advanced algebra				-0.008	-0.069	3674
MD advanced algebra				-0.038	-0.149	271
	R^2 = 0.0605			R^2 = 0.0866		
	Adj. R^2 = 0.0517			Adj. R^2 = 0.0812		
	F-statistic = 6.844			F-statistic = 15.836		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates the chance probability of an affect this large is $\leq .05$.

TABLE 24--Continued

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Personal Characteristics						
Male						
Hispanic	0.342	1.664	533	-0.070	-0.384	877
Black	-0.281	-1.004	247	-0.392*	-2.004	768
Native American	0.800	1.553	61	0.903	1.876	77
Asian	-0.452	-1.024	86	-0.787*	-2.057	129
Other	-3.031	-0.771	1	0.918	0.629	8
Female						
Hispanic	0.228	1.007	487	0.096	0.511	924
Black	0.253	0.956	331	0.200	-1.072	1015
Native American	1.865*	3.452	56	0.892	1.704	65
White	0.271	1.753	1778	0.225	1.612	1975
Asian	-0.125	-0.272	81	-0.620	-1.582	125
Other	5.599*	2.024	2	2.044	1.113	5
Achievement--10th grade						
Verbal	0.020	1.764	5256	0.038*	4.659	7726
Math	-0.011	-1.202	5256	-0.022*	-2.724	7726
Civics	-0.011	-1.599	5256			
Science	0.002	0.230	5256			
SES	-0.076	-0.730	5256	-0.167*	-2.136	7726
Work value	-0.267	-1.187	5146	0.149	1.017	7726
MD work value	0.920	1.743	110			
Self-esteem	-0.004	-0.043	5121	0.013	0.155	7726
MD self-esteem	-0.517	-1.079	135			
Average grades	-0.924*	-10.378	5235	-1.355*	-16.567	7726
MD average grades	0.121	0.141	21			
College aspiration - Y				0.384*	3.196	3963
College aspiration - N				0.380*	2.646	1494
MD college aspiration				0.168	0.665	287
Community Characteristics						
Northeast	0.647*	3.995	1092	0.262	1.726	1360
South	0.150	0.997	1668	-0.163	-1.226	2991
West	1.379*	7.937	1001	1.232*	8.116	1556
Rural	0.098	0.473	977	-0.349	-1.941	1011
MD rural	-0.209	-1.266	696	0.298	1.894	769
Urban	0.018	0.116	2700	-0.280*	-2.192	4576
Community unemployment rate	0.009	0.395	5256	-0.023	-1.170	7726

TABLE 25

FACTORS INFLUENCING DROPPING OUT
INDIVIDUALS
SOPHOMORES

Variable	Parameter Estimate	t-value	n
Intercept	0.641	13.170	6194
School Characteristics			
Vocational	0.074*	2.593	87
Area vocational school available	0.007	0.972	4460
School size			
1. 0-49	0.021	1.305	315
2. 50-99	0.003	0.222	442
3. 100-199	0.010	1.004	1082
4. 200-299	-0.008	-0.889	1248
5. 300-499	Reference Group		
6. 500-749	-0.031*	-2.981	933
7. 750-1499	-0.009	-0.456	189
Education			
Concentrator	-0.042*	-2.856	768
Limited Concentrator	-0.079*	-7.945	1115
Concentrator/Explorer	-0.054*	-5.161	779
Academic	-0.065*	-2.119	72
SR Academic	-0.029*	-3.523	1993
SR Vocational	0.044*	4.781	1180
Specialty			
Agriculture	-0.019*	-3.884	6194
Business	-0.025*	-9.265	6194
Health	-0.025*	-2.511	6194
Occupational home economics	-0.042*	-6.447	6194
Trade & industry	-0.022*	-8.761	6194
Distributive ed.	-0.029*	-4.617	6194

R^2 = 0.2303

Adj. R^2 = 0.2240

F - statistic = 36.764

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates that the chance probability of an effect this large is $\leq .05$.

TABLE 25--Continued

Variable	Parameter Estimate	t-value	n
Personal Characteristics			
Male			
Hispanic	-0.034*	-2.782	632
Black	-0.051*	-3.069	299
Native American	-0.093*	-3.036	73
Asian	-0.039	-1.383	90
Other	0.182	1.233	3
Female			
Hispanic	-0.012	-0.895	599
Black	-0.061*	-3.846	381
Native American	-0.043	-1.314	64
White	0.003	0.333	2066
Asian	-0.038	-1.298	83
Other	-0.150	-0.829	2
Achievement--10th grade			
Verbal	-0.003*	-4.416	6194
Math	-0.000	-0.565	6194
Civics	-0.000	-0.398	6194
Science	-0.001	-1.819	6194
SES	-0.045*	-7.288	6194
Work value	-0.021	-1.588	6041
MD work value	0.019	0.647	153
Self-esteem	-0.011*	-1.979	6005
MD self-esteem	0.030	1.086	189
Absenteeism	0.009*	10.839	6194
Average grades	-0.052*	-9.961	6167
MD average grades	0.074	1.490	27
Community Characteristics			
Northeast	-0.020*	-2.237	1263
South	0.020*	2.276	2024
West	0.018	1.720	1177
Rural	-0.012	-1.007	1168
MD rural	-0.061*	-5.875	727
Urban	-0.006	-0.619	3265
Community unemployment rate	0.000	0.106	6194

TABLE 26

FACTORS INFLUENCING DROPPING OUT
INDIVIDUALS
SOPHOMORES
PROBIT ANALYSIS

Variable	Coefficient	t-value	Effect
School Characteristics			
Vocational	0.284	1.207	0.0166
Area vocational school available	0.046	0.708	0.0020
School size			
1. 0-49	0.233	1.791	0.0129
2. 50-99	0.006	0.050	0.0003
3. 100-199	0.081	0.919	0.0037
4. 200-299	-0.085	-0.993	-0.0035
5. 300-499		Reference Group	
6. 500-749	-0.295*	-3.032	-0.0104
7. 750-1499	0.055	0.327	0.0025
Education			
Concentrator	-0.964*	-4.613	-0.0219
Limited Concentrator	-1.330*	-7.162	-0.0303
Concentrator/Explorer	-0.285*	-2.967	-0.0100
Academic	-3.026	-0.209	-0.0176
SR Academic	-0.445*	-4.890	-0.0168
SR Vocational	0.279*	3.873	0.0146
Specialty			
Agriculture	-0.075	-1.635	-0.0031
Business	-0.281*	-7.836	-0.0214
Health	-0.447	-1.938	-0.0123
Occupational home economics	-0.327*	-4.508	-0.0116
Trade & industry	-0.070*	-2.681	-0.0033
Distributive ed.	-0.150	-1.955	-0.0058

NOTES: SR refers to self-report, MD refers to missing data. The probit effect estimates are evaluated around the mean of the latent probit variable. For the curriculum index, the effects are instantaneous effects evaluated at the mean of the latent probit variable. Effects of the dichotomous vocational profile variables are evaluated by subtracting predicted value with the profile variable set to 0 from the predicted value with the profile variable set to 1.0, and all other independent variables set to their means.

*Indicates that the chance probability of an effect this large is $\leq .05$.

TABLE 26--Continued

Variable	Coefficient	t-value	Effect
Personal Characteristics			
Male			
Hispanic	-0.148	-1.472	-0.0057
Black	-0.225	-1.631	-0.0077
Native American	-0.634*	-2.309	-0.0145
Asian	-0.338	-1.218	-0.0111
Other	0.895	0.996	0.0954
Female			
Hispanic	0.080	0.742	0.0038
Black	-0.361*	-2.494	-0.0108
Native American	0.476	0.165	0.0022
White	0.213*	2.549	0.0100
Asian	-0.137	-0.389	-0.0052
Other	-2.781	-0.033	-0.0176
Achievement--10th grade			
Verbal	-0.018*	-2.822	-0.0003
Math	-0.005	-0.940	-0.0020
Civics	0.002	0.434	0.0001
Science	-0.002	-0.479	-0.0001
SES	-0.376*	-6.951	-0.0163
Work value	0.282*	3.227	0.0122
MD work value	0.093	0.441	0.0040
Self-esteem	0.030	0.627	0.0013
MD self-esteem	0.116	0.583	0.0051
Absenteesim	0.037*	6.828	0.0016
Average grades	-0.379*	-8.622	-0.0164
MD average grades	0.520	1.586	0.0226
Community Characteristics			
Northeast	-0.088	-0.930	-0.0036
South	0.236*	2.989	0.0112
West	0.174	1.875	0.0085
Rural	0.048	0.445	0.0021
MD Rural	-0.456*	-4.136	-0.0140
Urban	0.094	1.091	0.0040
Community unemployment rate	0.022*	1.965	0.0010

Rates for Institutions

A set of equations was also estimated to predict several institutional rates. These were program-related placement, average test scores, postsecondary attendance, in-school attendance, and dropout rates. The results are quite tentative because the available data were very limited for this purpose. In particular, there are, at most, 16 vocational schools available in the sample with complete data. It was not possible to estimate for area vocational schools because the number reporting attending them could be as few as one or two students for any one school. The results are presented in tables 27 through 32. The highlights follow the tables.

Only in one instance was there a significant effect differentiating a vocational high school from a comprehensive high school. This was in 12th-grade verbal scores for the senior cohort, where the vocational schools had higher averages! Moreover, the two types of schools did not differ from each other in postsecondary attendance rates or program-related placement rates. Because comprehensive high schools might reasonably be expected to send more students on to postsecondary education, and vocational schools might be expected to have higher program-related placement rates, this lack of difference is most unexpected. However, the limits of the data do not permit any strong conclusions about these findings. It is interesting to note that dropout rates are a function of school size, with smaller schools having lower rates. This finding is not a function of urbanicity, because that variable was controlled in the equation.

The results emphasize that major questions about institutional effects remain unanswered, at least as far as differences among vocational and comprehensive high schools are concerned, and that the available data are inadequate to provide the answers. The next section describes an approach that adds at least some new information to the body of available knowledge.

Institutional differences in teacher and student motivation. The longitudinal databases that are available did not provide adequate information to assess the characteristics of area vocational schools because these were either not identified or were excluded from the sample. Yet there has been a recent and massive investment in schools of this type.

Some policy documents (e.g., Committee for Economic Development [1985]) have recommended such schools as the most appropriate institution for delivering vocational education despite the lack of concrete national evidence of their effectiveness. The current ferment of educational reform also frequently discourages vocational education in the comprehensive high school. Although adequate data are not available, some information can be gleaned from current studies. For example, one such study, Understanding the

TABLE 27

FACTORS INFLUENCING VOCATIONAL PROGRAM-RELATED PLACEMENT

INSTITUTIONS

SOPHOMORES

Variable	Parameter Estimate	t-value	n
Intercept	-0.104	-0.591	696
School Characteristics			
Vocational	0.045	1.240	13
Area vocational school available	-0.005	-0.547	502
School Size			
1. 0-49	0.014	0.595	38
2. 50-99	0.032	1.494	45
3. 100-199	0.023	1.561	108
4. 200-299	0.011	0.917	134
5. 300-499		Reference Group	
6. 500-749	0.015	1.171	121
7. 750-1499	0.024	1.022	26
Education			
Concentrator	0.148*	3.145	696
Limited Concentrator	0.070*	2.019	696
Concentrator/Explorer	0.090*	2.604	696
Academic	-0.049	-0.407	696
SR Academic	0.021	0.793	696
SR Vocational	0.037	0.168	696
Specialty			
Agriculture	-0.009	-0.613	696
Business	-0.007	-0.914	696
Health	-0.031	-0.780	696
Occupational home economics	-0.015	-0.779	696
Trade & industry	0.035	4.796	696
Distributive ed.	0.003	0.110	696

R^2 = 0.1773

Adj. R^2 = 0.1176

F-statistic = 2.971

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates the chance probability of an affect this large is $\leq$ .05.

TABLE 27--Continued

Variable	Sophomore Parameter Estimate	t-value	n
Personal Characteristics			
Male			
Hispanic	0.019	0.410	696
Black	-0.062	-1.100	696
Native American	-0.094	-0.771	696
Asian	-0.123	-1.184	696
Other	0.054	0.127	696
Female			
Hispanic	0.001	0.031	696
Black	-0.098	-1.740	696
Native American	-0.006	-0.045	696
White	0.013	0.286	696
Asian	0.029	0.282	696
Other	1.103	1.443	696
Achievement--10th grade			
Verbal	0.001	0.357	696
Math	0.000	0.029	696
Civics	-0.001	-0.913	696
Science	-0.001	-0.600	696
SES	0.006	0.266	696
Work value	0.092	1.621	696
Self-esteem	-0.002	-0.069	696
Absenteeism	-0.000	-0.140	696
Average grades	0.017	0.996	696
Community Characteristics			
Northeast	0.009	0.632	141
South	-0.004	-0.354	218
West	0.004	0.267	136
Rural	-0.018	-0.540	696
MD rural	0.025	0.839	696
Urban	0.002	0.098	696
Community unemployment rate	-0.004	-2.408	696

TABLE 28

FACTORS INFLUENCING 12TH GRADE VERBAL SCORES

INSTITUTIONS

Variable	Sophomore Parameter Estimate	Sophomore t-value	Sophomore n	Senior Parameter Estimate	Senior t-value	Senior n
Intercept	19.980	5.440	699	47.619	30.613	744
School Characteristics						
Vocational	0.175	0.249	13	1.617*	1.965	16
Area vocational school available	0.145	0.764	505			
School Size						
1. 0-49	-0.574	-1.290	39	-0.577	-0.920	36
2. 50-99	-0.443	-1.053	45	0.108	0.210	47
3. 100-199	0.303	1.069	108	0.063	0.172	120
4. 200-299	-0.132	-0.549	136	-0.353	-1.132	141
5. 300-499		Reference Group			Reference Group	
6. 500-749	-0.011	-0.045	121	0.138	0.438	130
7. 750-1499	-0.578	-1.266	26	-0.506	-0.920	31
Education						
Concentrator	-0.325	-0.304	699			
Limited Concentrator	-0.406	-0.480	699			
Concentrator/Explorer	-0.017	-0.019	699			
Academic	-0.183	-0.064	699			
SR Academic	-0.838	1.527	699	3.161*	4.390	744
SR Vocational	-0.213	-0.339	699	-1.112	-1.485	744
Specialty						
Agriculture	-0.596*	-2.080	699			
Business	0.016	0.103	699			
Health	-0.632	-0.770	699			
Occupational home economics	-0.607	1.448	699			
Trade & industry	0.002	0.016	699			
Distributive ed.	-0.011	-0.236	699			
Remedial English				-1.535	-1.776	744
MD remedial English				3.545	0.797	744
Remedial math				0.570	0.630	744
MD remedial math				-6.519	-1.531	744
Advanced algebra				2.680*	4.000	744
MD advanced algebra				1.241	0.737	744
R^2	0.8124			0.6552		
Adj. R^2	0.7988			0.6360		
F-statistic	59.976			34.294		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates the chance probability of an affect this large is $\leq .05$.

TABLE 28--Continued

INSTITUTIONS

Variable	Sophomore Parameter Estimate	Sophomore t-value	Sophomore n	Senior Parameter Estimate	Senior t-value	Senior n
Personal Characteristics						
Male						
Hispanic	-0.583	-0.632	699	-6.658*	-5.901	744
Black	-0.982	-8.866	699	-6.452*	-6.909	744
Native American	3.482	1.403	699	-8.862*	-2.892	744
Asian	1.109	0.509	699	-4.745*	-2.242	744
Other	-1.167	-0.428	699	1.139	0.227	744
Female						
Hispanic	0.629	0.666	699	-6.238*	-5.772	744
Black	-1.765	-1.456	699	-8.691*	-8.176	744
Native American	-4.142	-1.560	699	-4.262	-1.132	744
White	0.981	1.016	699	-1.774	-1.684	744
Asian	-3.365	-1.529	699	-4.276	-1.606	744
Other	3.903	0.883	699	-7.018	-1.286	744
Achievement--10th grade						
Verbal	0.599*	12.028	699			
Math	0.062	1.655	699			
Civics	0.008	0.268	699			
Science	0.021	0.606	699			
SES	2.083*	5.525	699	1.973*	4.565	744
Work value	-1.086	-0.919	699			
Self-esteem	-0.100	-0.197	699			
Absenteeism	-0.074	-1.345	699	-0.077	-1.121	744
Average grades	0.723*	2.085	699	2.043*	4.810	744
College aspiration - Y				1.046	1.293	744
College aspiration - N				-1.286	-1.352	744
MD college aspiration				-4.442*	-3.304	744
Community Characteristics						
Northeast	0.310	1.187	141	-0.377	-1.107	153
South	-0.093	-0.390	218	-1.021*	-3.155	233
West	0.260	0.858	136	-0.127	-0.332	152
Rural	0.949	1.387	699	-1.843	-1.918	744
MD rural	-0.801	-1.438	699	-0.912	-0.850	744
Urban	-0.095	-0.183	699	-0.009	-0.014	744
Community unemployment rate	-0.061	-1.711	699	-0.090	-1.959	744

TABLE 29

FACTORS INFLUENCING 12TH GRADE MATH SCORES
INSTITUTIONS

Variable	Sophomore Parameter Estimate	Sophomore t-value	Sophomore n	Senior Parameter Estimate	Senior t-value	Senior n
Intercept	15.552	3.648	699	47.058	28.296	738
School Characteristics						
Vocational	-0.803	-0.987	13	0.919	1.047	16
Area vocational school available	-0.054	-0.244	505			
School size						
1. 0-49	-0.559	-1.083	39	-0.916	-1.369	36
2. 50-99	-0.973*	-1.993	45	-0.432	-0.787	47
3. 100-199	0.219	0.667	108	0.137	-0.352	118
4. 200-299	-0.025	-0.090	136	0.307	0.920	139
5. 300-499		Reference Group			Reference Group	
6. 500-749	0.236	0.822	121	0.484	1.439	130
7. 750-1499	-0.070	-0.132	26	0.017	0.028	30
Education						
Concentrator	0.134	0.108	699			
Limited Concentrator	0.037	0.038	699			
Concentrator/Explorer	-0.358	-0.347	699			
Academic	5.875	1.781	699			
SR Academic	0.520	0.816	699	2.824*	3.667	738
SR Vocational	-0.393	-0.538	699	-2.118*	-2.654	738
Specialty						
Agriculture	-0.645	-1.940	699			
Business	-0.076	-0.425	699			
Health	0.292	0.306	699			
Occupational home economics	-0.030	-0.061	699			
Trade & industry	-0.090	-0.555	699			
Distributive ed.	0.533	0.975	699			
Remedial English				-0.356	-0.407	738
MD remedial English				9.317*	1.966	738
Remedial math				-1.683	-1.741	738
MD remedial math				-5.339	-1.177	738
Advanced algebra				4.973*	6.938	738
MD advanced algebra				-4.076	-2.227	738
R^2	0.7640			0.6838		
Adj. R^2	0.7469			0.6661		
F-statistic	44.829			38.703		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates the chance probability of an affect this large is $\leq .05$.

TABLE 29--Continued

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Personal Characteristics						
Male						
Hispanic	0.368	0.344	699	-5.465*	-4.460	738
Black	-1.327	-1.008	699	-7.365*	-5.633	738
Native American	5.008	1.739	699	-7.803*	-2.389	738
Asian	1.785	0.706	699	-0.538	-0.239	738
Other	-1.371	-0.433	699	5.568	1.043	738
Female						
Hispanic	-0.522	-0.477	699	-8.606*	-7.408	738
Black	-1.122	-0.797	699	-10.952*	-9.638	738
Native American	-7.845*	-2.546	699	-8.959*	-2.233	738
White	-0.288	-0.257	699	-4.118*	-3.658	738
Asian	-2.426	-0.950	699	-5.078	-1.787	738
Other	3.927	0.766	699	-1.534	-0.263	738
Achievement--10th grade						
Verbal	0.183*	3.172	699			
Math	0.473*	10.873	699			
Civics	-0.009	-0.256	699			
Science	0.077	1.871	699			
SES	1.626*	3.716	699	1.706*	3.687	738
Work value	-0.086	-0.063	699			
Self-esteem	-0.709	-1.207	699			
Absenteeism	-0.019	-0.307	699	-0.056	-0.761	738
Average grades	1.597*	3.965	699	2.280*	5.034	738
College aspiration - Y				2.006*	2.307	738
College aspiration - N				-0.220	-0.216	738
MD college aspiration				-3.750*	-2.566	738
Community Characteristics						
Northeast	-0.163	-0.538	141	-0.679	-1.861	149
South	-0.412	-1.486	218	-1.618*	-4.680	233
West	-0.262	-0.743	136	-0.265	-0.647	150
Rural	0.288	0.363	699	-0.539	-0.525	738
MD rural	-0.201	-0.311	699	-2.397*	-2.086	738
Urban	-0.540	-0.891	699	-0.694	-0.943	738
Community unemployment rate	-0.088*	-2.138	699	-0.104*	-2.131	738

TABLE 30

FACTORS AFFECTING POSTSECONDARY ATTENDANCE
INSTITUTIONS

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Intercept	-0.519	-2.219	701	-0.302	-1.227	738
School Characteristics						
Vocational	-0.040	-0.890	13	0.021	0.421	16
Area vocational school available	-0.003	-0.238	506			
School size						
1. 0-49	0.019	0.682	39	-0.086*	-2.280	36
2. 50-99	-0.002*	-0.065	46	-0.015	-0.472	47
3. 100-199	-0.008	-0.433	108	-0.044*	-1.995	118
4. 200-299	0.009	-0.586	136	-0.040*	-2.119	139
5. 300-499		Reference Group			Reference Group	
6. 500-749	-0.004	-0.249	122	-0.009	-0.474	130
7. 750-1499	-0.014	-0.481	26	0.042	1.235	30
Education						
Concentrator	0.065	0.953	701			
Limited Concentrator	0.099	1.832	701			
Concentrator/Explorer	0.062	1.091	701			
Academic	0.221	1.218	701			
SR Academic	0.016	0.460	701	0.057	1.281	738
SR Vocational	-0.093*	-2.309	701	-0.096*	-2.120	738
Specialty						
Agriculture	-0.013	-0.710	701			
Business	0.002	0.240	701			
Health	0.058	1.110	701			
Occupational home economics	0.013	0.494	701			
Trade & industry	-0.010	-1.097	701			
Distributive ed.	-0.019	-0.634	701			
Remedial English				-0.009	-0.164	738
MD remedial English				0.360	1.338	738
Remedial math				-0.038	-0.683	738
MD remedial math				-0.496	-1.930	738
Advanced algebra				0.094*	2.246	738
MD advanced algebra				-0.044	-0.421	738
R^2	0.5020			0.4546		
Adj. R^2	0.4662			0.4208		
F-statistic	14.007			13.450		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates the chance probability of an affect this large is $\leq .05$.

TABLE 30--Continued

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Personal Characteristics						
Male						
Hispanic	0.158*	2.673	701	0.066	0.933	738
Black	0.141	1.938	701	0.024	0.316	738
Native American	0.343*	2.159	701	0.011	0.057	738
Asian	0.306*	2.192	701	0.037	0.288	738
Other	-0.089	-0.510	701	0.530	1.756	738
Female						
Hispanic	0.195*	3.220	701	0.010	0.145	738
Black	0.200*	2.575	701	0.087	1.264	738
Native American	0.133*	0.788	701	0.029	0.126	738
White	0.043	0.697	701	-0.069	-1.069	738
Asian	0.241	1.707	701	0.318*	1.968	738
Other	0.067	0.236	701	0.290	0.878	738
Achievement--10th grade						
Verbal	0.010*	3.085	701	-0.003	-1.086	738
Math	0.004	1.870	701	0.007*	2.725	738
Civics	-0.001	-0.551	701			
Science	-0.002	-1.083	701			
SES	0.189*	7.824	701	0.119*	4.431	738
Work value	0.092	1.218	701	0.058	1.007	738
Self-esteem	0.046	1.425	701	0.035	1.054	738
Absenteeism	-0.010*	-2.992	701	0.008*	1.994	738
Average grades	0.071*	3.186	701	0.102*	3.885	738
College aspiration - Y				0.143*	2.892	738
College aspiration - N				-0.177*	-3.070	738
MD college aspiration				-0.002	-0.029	738
Community Characteristics						
Northeast	-0.014	-0.849	141	-0.033	-1.606	149
South	-0.050*	-3.300	218	-0.046*	-2.289	233
West	-0.006	-0.332	138	-0.021	-0.886	150
Rural	-0.048	-1.092	701	-0.093	-1.600	738
MD rural	0.087*	2.429	701	0.138*	2.106	738
Urban	-0.046	-1.381	701	-0.016	-0.372	738
Community unemployment rate	-0.002*	-0.951	701	0.002	0.813	738

TABLE 31

FACTORS AFFECTING ATTENDANCE RATES
INSTITUTIONS

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Intercept	87.570	10.752	673	92.793	13.749	709
School Characteristics						
Vocational	2.664	1.695	13	0.992	0.730	16
Area vocational school available	-0.663	-1.535	486			
School size						
1. 0-49	1.515	1.502	37	0.806	0.769	34
2. 50-99	0.259	0.271	44	0.566	0.659	45
3. 100-199	0.744	1.152	103	0.487	0.793	112
4. 200-299	-0.592	-1.091	133	-0.646	-1.235	136
5. 300-499		Reference Group			Reference Group	
6. 500-749	0.130	0.231	116	-0.061	-0.115	124
7. 750-1499	-2.035	-1.916	24	-1.304	-1.379	28
Education						
Concentrator	0.079	0.033	673			
Limited Concentrator	-1.898	-0.996	673			
Concentrator/Explorer	-0.268	-0.134	673			
Academic	0.900	0.143	673			
SR Academic	1.249	1.011	673	0.913	0.755	709
SR Vocational	0.190	0.133	673	0.774	0.620	709
Specialty						
Agriculture	0.483	0.743	673			
Business	0.250	0.718	673			
Health	-3.593	-1.954	673			
Occupational home economics	1.335	1.467	673			
Trade & industry	0.142	0.453	673			
Distributive ed.	-0.117	-0.110	673			
Remedial English				-1.238	-0.857	709
MD remedial English				-2.838	-0.376	709
Remedial math				2.193	1.434	709
MD remedial math				-4.207	-0.578	709
Advanced algebra				-1.243	-1.081	709
MD advanced algebra				2.565	0.892	709
R^2	0.3792			0.3387		
Adj. R^2	0.3336			0.2980		
F-statistic	8.314			8.332		

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates that the chance probability of an effect this large is $\leq .05$.

TABLE 31--Continued

Variable	Sophomore			Senior		
	Parameter Estimate	t-value	n	Parameter Estimate	t-value	n
Personal Characteristics						
Male						
Hispanic	-0.185	-0.089	673	0.509	0.257	709
Black	-7.534*	-2.936	673	-4.130	-1.917	709
Native American	-2.651	-0.470	673	-1.158	-0.227	709
Asian	7.467	1.521	673	-3.344	-0.954	709
Other	-16.275*	-2.452	673	-1.803	-0.214	709
Female						
Hispanic	-4.329*	-2.023	673	-5.236*	-2.769	709
Black	-3.509	-1.272	673	-6.834*	-3.530	709
Native American	-3.967	-0.669	673	-8.345	-1.325	709
White	1.401	0.642	673	-0.098	-0.055	709
Asian	-10.613*	-2.153	673	-0.407	-0.092	709
Other	-7.606	-0.767	673	-15.085	-1.644	709
Achievement--10th grade						
Verbal	0.268*	2.371	673	-0.076	-0.959	709
Math	-0.131	-1.551	673	0.257*	3.484	709
Civics	0.119	1.812	673			
Science	0.033	0.420	673			
SES	2.246*	2.629	673	1.983*	2.719	709
Work value	0.253	0.093	673	-1.635	-1.025	709
Self-esteem	-1.909	-1.665	673	-0.962	-1.062	709
Average grades	-1.398	-1.812	673			
College aspiration - Y				-2.308	-1.696	709
College aspiration -				-0.189	-0.119	709
MD college aspiration				2.220	0.936	709
Community Characteristics						
Northeast	-2.792*	-4.732	136	-2.889*	-5.091	143
South	2.272*	4.208	209	2.422*	4.460	224
West	-0.787	-1.151	129	-0.410	-0.653	141
Rural	1.903	1.220	673	2.329	1.450	709
MD rural	0.782	0.617	673	-4.593*	-2.523	709
Urban	-0.998	-0.843	673	-0.175	-0.151	709
Community unemployment rate	0.046	0.559	673	-0.036	-0.459	709

TABLE 32

FACTORS INFLUENCING DROPOUT RATES
INSTITUTIONS

Variable	Parameter Estimate	Sophomore t-value	n
Intercept	-6.120	-0.434	679
School Characteristics			
Vocational	-0.602	-0.222	12
Area vocational school available	-0.506	-0.711	489
School size			
1. 0-49	-6.756*	-3.591	31
2. 50-99	-4.723*	-3.012	46
3. 100-199	-3.058*	-2.881	106
4. 200-299	-1.377	-1.532	132
5. 300-499	Reference Group		
6. 500-749	1.294	1.401	116
7. 750-1499	4.920*	2.913	26
Education			
Concentrator	-2.213	-0.553	679
Limited Concentrator	3.197	1.017	679
Concentrator/Explorer	-0.006	-0.002	679
Academic	2.499	0.238	679
SR Academic	-2.658	-1.266	679
SR Vocational	2.248	0.954	679
Specialty			
Agriculture	0.385	0.361	679
Business	-0.154	-0.266	679
Health	-1.379	-0.447	679
Occupational home economics	-1.945	-1.289	679
Trade & industry	-0.882	-1.709	679
Distributive ed.	-2.868	-1.582	679

R^2 = 0.2334

Adj. R^2 = 0.1763

F-statistic = 4.087

NOTE: SR refers to self-report, MD refers to missing data.

*Indicates the chance probability of an effect this large is $\leq$ .05.

TABLE 32--Continued

Variable	Sophomore		
	Parameter Estimate	t-value	n
Personal Characteristics			
Male			
Hispanic	4.319	1.221	679
Black	5.641	1.326	679
Native American	6.306	0.675	679
Asian	-6.807	-0.842	679
Other	5.722	0.552	679
Female			
Hispanic	7.239*	2.022	679
Black	4.757	1.028	679
Native American	5.705	0.582	679
White	5.391	1.502	679
Asian	14.974	1.835	679
Other	17.338	1.044	679
Achievement--10th grade			
Verbal	-0.002	-0.011	679
Math	0.025	0.178	679
Civics	-0.056	-0.509	679
Science	-0.043	-0.326	679
SES	-6.324*	-4.492	679
Work value	5.855	1.305	679
Self-esteem	-0.750	-0.392	679
Absenteeism	0.263	1.259	679
Average grades	1.153	0.885	679
Community Characteristics			
Northeast	0.132	0.133	133
South	0.988	1.107	210
West	0.178	0.158	137
Rural	0.196	0.076	679
MD rural	-0.872	-0.418	679
Urban	1.248	0.629	679
Community unemployment rate	0.095	0.717	679

Dynamics of Vocational Classrooms, is currently in progress at the National Center for Research in Vocational Education. This study offers an opportunity to assess similarities and differences between vocational classrooms (including those in area vocational schools) and other high school classes. This assessment is possible because a national sample of nearly 700 classrooms has been observed as part of the Classroom Dynamics study.

In this study, the observers were asked to rate on a 10-point scale the perceived attitude toward teaching and learning on the part of the teachers and students. The ratings were carried out as interviews, with three interviewers who used common examples to illustrate the scale. The observers had access to their own observation records while assigning the ratings to each class separately. The overall average for all classes was near the midpoint of the scale. The ratings actually used ranged from one to ten. Five types of classes were rated. They were vocational classes in either comprehensive high schools or area vocational schools, academic classes in comprehensive high schools, academic classes in feeder high schools that sent students to the area vocational schools, and academic classes in the vocational schools. Table 33 presents the results of this study. Two items of interest may be observed in this table. First, there is no significant differentiation among teachers, with regard to their attitudes toward teaching, among the types of classes. This is not an expected result because the higher status of academic classes, which tend to be populated with more able students, is assumed to be associated with greater teacher satisfaction (see, for example, Finley [1984]). On the contrary, the trends are in the opposite direction, with every one of the comparison classes scoring lower on the scale than the average of vocational classes in area vocational schools (table 33). Although individual comparisons do not meet the usual tests of significance, the uniformity of the direction of differences is highly unlikely to be a random occurrence.

The second item of interest is the pattern of student attitudes among the class types. Here the average for vocational classes in area vocational schools is higher than any other class type and significantly higher than any academic class type. Also, the vocational class average across comprehensive high schools is higher than the academic class average in the same schools. This finding is in keeping with the conventional wisdom that tangible tasks in which accomplishment can readily be perceived are sources of greater satisfaction for most people than abstract and uncertain accomplishments. Although not shown in the table, the observers also rated the overall school climate as a learning environment. Here the averages across all area vocational schools were significantly higher than those across comprehensive high schools (7.53 compared with 6.53, with a confidence band width of 0.79). Unfortunately, there are no data to determine the effect in the labor market of these more satisfying classes and schools.

TABLE 33

AVERAGE DIFFERENCE IN TEACHER AND STUDENT ATTITUDE AMONG CLASSROOM TYPES

Teacher Attitude toward Teaching

	Vocational Class Comp. 7.016	Academic Class Comp. 6.920	Academic Class Feeder 7.039	Academic Class Vocational 6.708
Vocational Class AVS 7.151	.135 (.184)	.231 (.476)	.112 (.547)	.443 (.990)
Vocational Class Comp. 7.016		.096 (.486)	-.023 (.555)	.308 (.507)
Academic Class Comp. 6.920			-.119 (.636)	.212 (1.042)
Academic Class Feeder 7.039				.331 (1.076)

Student Attitude toward Learning

	Vocational Class Comp. 6.418	Academic Class Comp. 5.624	Academic Class Feeder 5.984	Academic Class Vocational 5.625
Vocational Class AVS 6.734	.316 (.337)	1.110* (.480)	.750* (.532)	1.109* (1.054)
Vocational Class Comp. 6.418		.794* (.482)	.434 (.519)	.793 (1.047)
Academic Class Comp. 5.624			-.360 (.634)	-.001 (1.108)
Academic Class Feeder 5.984				.359 (1.125)

NOTE: Numbers in brackets represent the minimum significant difference between means.

*Indicates that a chance probability of a difference this large is $\leq .05$.

The evidence available from these studies does not present a consistent picture of advantage or disadvantage for school types. A discussion of the implications of these findings follows in the next chapter.

CHAPTER 5

SUMMARY AND CONCLUSIONS

The enactment of the Carl D. Perkins Act of 1984 has provided vocational researchers an opportunity to evaluate the delivery of vocational education within the secondary school system. This project has examined student outcomes (labor market and educational experiences) in terms of institutional type.

The results of this research suggest that very few measurable differences exist (for the variables specified) among the comprehensive, vocational, and area vocational high schools as effective vocational education delivery systems. Briefly, the research objectives were as follows:

- To describe the characteristics of comprehensive and vocational high schools (in terms of facilities, staff, programs, and students) that may have an effect on individual and institutional outcomes
- To examine the positive and negative labor market and educational (basic and postsecondary) outcomes for students as a function of the type of school they attended
- To examine the effects of the differences between comprehensive and vocational high schools on institutional outcomes

In response to the first objective, the highlights of the tabular analyses are summarized as follows:

- Differences between the vocational and comprehensive schools are minimal in terms of staff and facilities, though two differences are worthy of note. First, vocational instructors from both school types often have an associate degree or no degree, whereas academic teachers are more likely to have a bachelor's, master's, or doctorate degree. Second, teachers in the vocational schools have accumulated more years of non-teaching work experience whereas those in the comprehensive school have more years of teaching experience.

- Vocational school students tend to come from the lower SES/ability quartiles, are disproportionately male, and are more likely to concentrate in a specialty than their comprehensive school counterparts who take vocational courses.

- Students from the comprehensive schools (vocational and nonvocational) are more evenly distributed among the SES/ability quartiles, and male/female enrollment is also more uniform.

- Comprehensive school graduates (vocational and nonvocational) tend to enroll in postsecondary education more often than graduates of the vocational high schools. Seniors exhibit similar patterns of enrollment in the 2- and 4- year colleges. However, for the sophomores within each school type, the 4-year college (as compared to the 2-year) is the more popular choice for further education.

- Postsecondary employment figures reflect higher percentages of vocational students who are employed than nonvocational students in both cohorts.

- Vocational students work more hours. The senior data show a slight hourly wage advantage for vocational students that is not evident in the sophomore data.

Response to the last two objectives was accomplished through multivariate analyses that permit comparison among similar persons through the use of control variables. These results frequently differ from uncontrolled tabulations. Few differences among delivery systems emerged. These findings are summarized below with individual results presented first, followed by the institutional ones.

Individual Results

- Analysis of verbal and math scores produced mixed results. Verbal scores were not affected by attendance at a vocational school, but were negatively and significantly affected by attending an area vocational school. Math scores also reflected the negative and significant association with the area vocational school; however, the effects for vocational schools are mixed. No effect was found for sophomores, but a positive and significant effect was found for seniors.

- Although no relationship was evident for vocational schools, seniors attending an area vocational center were found to be significantly more likely to miss school for reasons other than illness. However, it is not known whether this absence occurred at the home school, the vocational school, or both.

- o No effect was found for school type when hourly and monthly wages were examined.

- o The incidence of dropping out was not influenced by attending a vocational school (analyzed for sophomores only).

- o When characteristics such as SES, ability, and residence are controlled attendance at a vocational high school or an area vocational school has no effect on rates of postsecondary attendance.

Institutional Results

Institutional-level data reveal few differences among school types:

- o Whereas sophomore average verbal scores did not differ from those of the comprehensive schools, the senior average scores did. Verbal scores increased significantly when the school attended is a vocational school.

- o School size was found to be significant in one instance. Average dropout rates are lower in the smaller schools.

- o No effect or difference was found for school type regarding vocational program-related placement, math scores, levels of postsecondary attendance, absenteeism rates, and dropout rates.

Staff Interview Results

Some interesting differences among classrooms and schools emerged:

- o There is no significant difference among teachers regarding their attitudes toward teaching in the types of classes examined (academic, and/or vocational classes in comprehensive, vocational, and area vocational schools).

- o The average rating of student attitude toward learning was higher in the vocational classes in the area vocational schools than in other class types and significantly higher than in any academic class.

- o School climate as a learning environment was rated higher in the area vocational schools than in the comprehensive schools.

Recommendations

One priority has emerged from this study of the delivery systems for secondary vocational education. There is a pressing need to collect high-quality data that is national in scope from all three types of institutions and, independently, from their graduates. Only then will the research that is needed to isolate the effects of institutions from the characteristics of their students be possible. In particular, the implications of motivation, factors influencing choice, and adequate assessment of student characteristics prior to entry need to be identified, measured, and studied. Other relationships observed need further research in order to understand what is operating. For example, why are small schools associated with lower dropout rates? Tracking has been observed to be a function of course difficulty in the academic areas rather than in vocational education. Can vocational students be taught with the necessary rigor in academics and still have time to acquire the necessary vocational skills? National data on such issues are sorely needed.

However, policy decisions need to be made with the data that are available, imperfect as they are. The movement of students through the system will not stop while we wait for better data. Therefore, the following recommendations appear justified.

- The present system of three primary delivery types should be continued because there is already a considerable investment in each of them and there is no clear advantage or disadvantage for any of them. It appears that each type is serving a somewhat different clientele. Unless the economies of an intended change recover the investment in a relatively short time period, none are justified by the present evidence.

- The disquieting suggestion that the area vocational schools may be slightly less effective in language and math instruction is partially offset by the evidence that their students are more highly motivated by their classes. This suggests that policymakers should establish incentives that would capitalize on this motivation as a vehicle to improve the acquisition of academic skills. It may also be true that students who attend area vocational schools are initially less able in these areas than their contemporaries in the comprehensive and full-time vocational schools.

- Incentives for increasing the academic training of vocational teachers seem worth exploring. Many students do not arrive at the vocational class with the requisite basic skills. Previous academic instruction has been unsuccessful. Reinforcement of these skills in the vocational classroom seems necessary. Vocational teachers need to be prepared to carry out this reinforcement.

- Further study of the causes of higher absenteeism in the area vocational schools should be encouraged. Is it a function of the disrupted school day through the increased travel, a characteristic of the students who attend such schools that is not accounted for in the present analyses, or some other problem in need of correction?

These recommendations call for more new research than is usual. This is the result of the absence of policies to encourage the collection of adequate data to evaluate the functioning of the complex institution that is secondary school vocational education. An enterprise that involves approximately 10 million young people and $9 billion annually should be worth an investment of .02 percent of its budget, about $2 million, to collect adequate data. The policy decisions that must and will be made will otherwise rest on opinion, surmise, and potentially self-serving advocacy.

As the educational reform movement continues, and legislative attention is turned toward the educational system, research must provide sound information as a basis for decision making, policy formation, and policy implementation. New directions in national policy (i.e., increased emphasis on reestablishing our nation's competitive edge in the world economy, boosting national productivity, and raising the academic and vocational skills of the workforce) place an additional burden of responsibility on the shoulders of research to be able to assess accurately the strengths and weaknesses of the educational system. The available data were found to be inadequate to address the questions that have been raised by lawmakers, educators, and researchers in this area. Furthermore, with monetary resources dwindling and budget cuts the norm for legislative behavior, money allocated to education is presently viewed more as a capital investment from which society expects a return as opposed to an expense that serves individuals and, at best, maintains the economic status quo. As such, the pressure continues for more and better quality data upon which to base policy decisions.

APPENDIX

Race/ ethnicity	White, black, Hispanic, Native American, Asian and other (majority white = reference group).
Gender	Male, female (male = reference group).
Region	Northeast, North Central, South, West (North Central = reference group).
Area of residence	Rural or urban (suburban = reference group).
Socioeconomic status (SES)	A created index for respondents at age 14 based on parents' occupation and education and certain household items.
High school curriculum pattern	High school pattern was determined first by using student transcripts and, if this was not possible, by using a student's self-report. In the descriptive information high school pattern is broken down into three categories as follows: o Vocational--further broken down into Concentrator, Limited Concentrator, Concentrator/ Explorer o Academic o General
Student high school curriculum pattern classification using high school transcripts	A student earning credit in any area of vocational education was categorized into one of the five patterns of vocational education: Limited Concentrator, Concentrator/Explorer, or Incindental Personal. This is done in the following way. Each of the five patterns has values for intensity, diversity, continuity, supportive diversity, and proximity that are characteristic of an average member of that pattern. The differences between these characteristics and their corresponding values held by the student are computed and squared for each of the five patterns. The squared differences are summed within each pattern. The pattern with the lowest score is the classification given to the student. An Explorer, however, may not have a specialty, so a student with a specialty who is closer to Explorer than any other pattern is assigned the next closest pattern. Incidental Personal respondents areas were therefore merged into either the Academic or the General pattern (General = reference group).

In the HS&B sophomore cohort, a student taking no vocational courses was classified as either Academic or General. If the student earned 3 or more credits in English; 2 or more credits in each of the areas of math, science, and social science; and 12 or more total credits in English, math, science, social science, and foreign languages, then that student is classified as Academic. Otherwise, the student is classified as General.

A student was classified as having "missing data" if--

- o the credit earned is missing for two or more courses; or
- o the transcript reports that a course was taken in a grade other than 9, 10, 11, or 12; or
- o 8 or more credits were earned in 2 or fewer courses in 1 year; or
- o any course was worth 5 or more credits; or
- o more than 12 credits were earned in 1 year; or
- o more than 32 credits were earned in the 4 years of high school.

Verified self-report

Verified self-report was used to determine a student's high school curriculum pattern when no transcripts were available or when the person's transcripts were invalid.

Selected questions in the first follow-up questionnaire were used to determine a student's curriculum as reported by that student. If the student reported taking 2 or more years of course work in a single vocational area--business, trade and industry, technical, or other (agriculture, health care, home economics, distributive education)--that student was classified as having taken a "Vocational" curriculum pattern. If a student did not meet these requirements but reported taking course work consisting of at least 3 years of English; at least 2 years of math, science, and social studies; plus an additional 3 or more credits in any of the following: English, math, science, social science, or a foreign language (totaling 12 or more credits), then that student was classified as having taken an "academic" curriculum pattern. If these requirements were not met and the student reported taking course work in <u>any</u> of the academic subjects, the student was classified as having taken a "general" curriculum

	pattern. A student who did not meet any of the criteria for vocational, academic, or general was classified as having "missing data."
Specialty	No specialty--those in the Academic, General, Explorer, and some Incidental Personal curriculum pattern respondents. Vocational specialties--agriculture, business, health care, trade and industry, home economics, and distributive education (marketing and merchandising). Unclassifiable--those in self-report curriculum patterns or with incomplete data.
Carnegie unit	A Carnegie unit required a minimum of 200 minutes for a regular class and 275 minutes for a lab class per week for 36 weeks. Some schools, however, may require more time for credit.
10th grade grade point average	Course credit for each course in the 10th grade was multiplied by the grade received for that course as follows: A+, A = 4.0; A-= 3.7; B+ = 3.3; B = 3.0; B- = 2.7; C+ = 2.3; C = 2.0; C- = 1.7; D+ = 1.3; D = 1.0; D- = 0. 7 These numbers were added together, then divided by the total number of credits for all 10th grade courses taken.
Absenteeism	How many days the respondent was absent from school for reasons other than illness.
Self-esteem	Additive score of various self-esteem questions asked of students in the 10th grade in HS&B. High values correspond with high self-esteem.
Training related (TR)	A person's occupation and industry area were determined based on the Census Bureau's three-digit code for occupation. If that person's vocational specialty matched the occupational area or a combination of occupation and industry, the person was designated as being in a training-related area of work.
Log hourly rate of pay	Natural log of reported hourly rate of pay.

Log monthly rate of pay	Natural log of reported monthly rate of pay.
Labor market experience	Number of weeks worked since graduation from high school or, if no graduation date was available, from the date of 18th birthday.
Work value	A created index of the value of work, based on the importance of the subjects following to the student in high school: experiencing success in work, having a lot of money, and finding steady work.
Work in high school	Whether the respondent held a job while attending high school.
College aspirations	Whether the student planned to go to college when in the eighth grade (yes = 1).
Community unemployment rate	From 1980 Census data.
Ever enrolled in postsecondary program	Student report of enrollment; whether or not currently enrolled.
Currently enrolled in postsecondary program	Self-report of enrollment status.
Vocational school	Full-time vocational high school.
Area vocational school available	Student could attend an area vocational school.
Classes taken away from home school	Senior cohort only.
School size	Number of students in 12th grade.
Remedial English	Self-report of taking class.
Remedial Math	Self-report of taking class.
Advanced Algebra	Self-report of taking class.

REFERENCES

Benson, Charles. "The Question of Quality." VocEd 57, no. 6 (1982): 27-29.

Benson, Charles, and Hoachlander, Garth. Descriptive Study of The Distribution of Federal, State, and Local Funds for Vocational Education. Final Report. The Project on National Vocational Education Resources. Berkeley: School of Education, University of California, 1981.

Boyer, Ernest L. High School: A Report on Secondary Education in America. New York: Harper and Row, 1983.

Bragg, Debra; Parks, Marie; Dauner, Mary Beth; Campbell, Paul B. Vocational Education Delivery Systems and Specialization: Impact on Groups of Special Interest. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1986.

Breci, Michael G. "Police Response to Domestic Disturbances." Ph.D. diss., Iowa State University, 1986.

Bridges, William P. "The Sexual Segregation of Occupations: Theories of Labor Stratification in Industry." American Journal of Sociology 88 (1982): 270-295.

Campbell, Paul B., and Basinger, Karen S. Economic and Non-economic Effects of Alternative Transitions through School to Work. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1985.

Campbell, Paul B.; Basinger, Karen S.; Dauner, Mary Beth; and Parks, Marie A. Outcomes of Vocational Education for Women, Minorities, the Handicapped, and the Poor. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1986.

Campbell, Paul B.; Gardner, John A.; and Seitz, Patricia. Postsecondary Experience of Students with Varying Participation In Secondary Vocational Education. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1982.

Campbell, Paul B.; Orth, Mollie N.; and Seitz, Patricia. Patterns of Participation in Secondary Vocational Education. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1981.

Campbell, Paul B., and Panzano, Phyllis. Elements of Vocational Program Quality. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1985.

Clark, David L.; Lotto, Linda S.; and Astuto, Terry R. "Effective Schools and School Improvement: A Comparative Analysis of Two Lines of Inquiry." Educational Administration Quarterly 20, no. 3 (Summer 1984): 41-68.

Cohen, Jacob, and Cohen, Patricia. Applied Multiple Regression/ Correlation Analysis for the Behavioral Sciences. Hillsdale, NJ: Lawrence Erlbaum Associates, 1983.

Committee for Economic Development. Investing in Our Children--Business and the Public Schools. Committee for Economic Development, Washington, DC: 1985.

Conroy, William G., Jr. "Some Historical Effects of Vocational Education at the Secondary Level." Phi Delta Kappan 61, no. 4 (December 1979): 267-271.

David, Henry. "Alternative Vocational Education Research Agendas." In Vocational Education Research in the 1980's, edited by H. David, H. F. Hjelm, and R. C. Harris. Bloomington: American Vocational Education Research Association in cooperation with the School of Education and Indiana University Publication Office, 1983.

Davis-Blake, Alison. "Career Contingencies: Organization Effects on Individual Earnings and Promotions." Ph.D. diss., Stanford University, 1986.

Ekstrom, Ruth B.; Freeberg, Norman E.; and Rock, Donald A. "The Effects of Youth Employment Program Participation on Later Employment." Evaluation Review 11, no. 1 (February 1987): 84-101.

Evans, Rupert N. "Vocational Education and Reindustrialization." In Contemporary Challenge for Vocational Education, edited by Katy B. Greenwood. Arlington, VA: American Vocational Association, 1981.

Evans, Rupert N. "Why Vocational Education Belongs in the Comprehensive High School." VocEd 57 no. 6 (1982): 24-26.

Finley, Merrilee K. "Teachers and Tracking in a Comprehensive High School." Sociology of Education 57 (October 1984): 233-243.

Firebaugh, Glenn. "A Rule for Inferring Individual-Level Relationships from Aggregate Data." American Sociological Review 43 (1978): 557-572.

Gardner, John A. Influences of High School Curriculum on Determinants of Labor Market Experience. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1984.

Gelb, J. Beyond the Academic, Nonacademic Dichotomy: High School Curriculum Effects and Educational Attainment. Baltimore, MD: Johns Hopkins University, Center for Social Organization of Schools, 1979.

Gilli, Angelo C., Sr. Modern Organizations of Vocational Education. University Park, PA: The Pennsylvania State University Press, 1976.

Goodlad, John I. A Place Called School: Prospects for the Future. New York, NY: McGraw-Hill Book Company, 1984.

Grasso, J. T., and Shea, J. R. Vocational Education and Training: Impact on Youth. Berkeley, CA: The Carnegie Council on Policy Studies in Higher Education, 1979.

Haller, Archibald O. "Reflections on the Social Psychology of Status Attainment." In Social Structure and Behavior: Essays in Honor of William H. Sewell, edited by Robert F. Hauser, David Mechanic, and Archibald O. Haller. New York: Academic Press, 1982.

Horan, Patrick. "Is Status Attainment Research Atheoretical?" American Sociological Review 43 (1978): 534-541.

Johnson, Michael P., and Sell, Ralph R. "The Cost of Being Black: a 1970 Update." American Journal of Sociology 82 (1976): 183-190.

Jones, Calvin; Knight, Shirley; and Ingels, Steven. Administrator and Teacher Survey: Final Report. Chicago: University of Chicago, National Opinion Research Center, 1984.

Kolstad, A. J. "The Influence of High School Type and Curriculum on Enrollment in Higher Education and Postsecondary Training." Paper presented at the American Education Research Association Meeting, San Francisco, 1979. (ERIC No. ED 172 627).

Lewin-Epstein, Noah. Youth Employment During High School. An Analysis of High School and Beyond: A National Longitudinal Study for the 1980s. Washington, DC: National Center for Education Statistics, 1981.

MacKenzie, D. "Research for School Improvement: An Appraisal of Some Recent Trends." Educational Researcher 12, no. 4 (April 1983): 12-18.

Martini, Elizabeth. "Delivery Systems for Vocational Education and Student Outcomes: Differences in Selected Attitudinal Outcomes for Home School and Occupational Center Vocational Students." Ph.D. diss., Cornell University, 1984.

Mertens, Donna M.; McElwain, Douglas; Garcia, Gonzalo; and Whitmore, Mark. The Effects of Participating in Vocational Education: Summary of Studies Reported Since 1968. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1980.

Meyer, Robert H. An Economic Analysis of High School Vocational Education: IV. The Labor Market Effects of Vocational Education. Washington, DC: The Urban Institute, 1981.

Meyer, Robert H., and Wise, David A. High School Preparation and Early Labor Force Experience. Working Paper no. 342. Cambridge, MA: National Bureau of Economic Research, 1979.

Mincer, Jacob, and Polacheck, Soloman W. "Family Investment in Human Capital: Earnings of Women." Journal of Political Economy 82 (March/April, 1974): S74-S108.

National Center for Education Statistics. The Condition of Education. Washington, DC: U.S. Government Printing Office, 1981.

National Commission for Employment Policy. The Federal Role in Vocational Education: Sponsored Research. Washington, DC: National Commission for Employment Policy, 1981.

National Institute of Education. The Vocational Education Study. Washington, DC: Department of Education, 1981.

Peterson, Paul E., and Rabe, Barry G. Urban Vocational Education and Managing the Transition from School to Work: A Review of a Series of Case Studies of Vocational Education. Washington, DC: A. L. Nellum and Associates, 1981.

Portes, Alejandro, and Wilson, Kenneth L. "Black-White Differences in Educational Attainment." American Sociological Review 41 (1976): 414-431.

Purkey, Stewart C., and Smith, Marshall S. Effective Schools: A Review. Madison, WI: Wisconsin Center for Educational Research, School of Education, University of Wisconsin, 1982.

Rumberger, Russell W., and Daymont, Thomas N. "The Economic Value of Academic and Vocational Training Acquired in High School." In Youth and the Labor Market, edited by Michael E. Borus, pp. 157-192. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 1984.

Sherman, Susan W. Education for Tomorrow's Jobs. Washington, DC: National Academy Press, 1983.

Smith, James P., and Welch, Finis R. "Black-White Male Wage Ratios: 1960-1970." American Economic Review 67 (June 1977): 323-338.

Swanson, Gordon. "Is High School the Place for Vocational Education?" VocEd 57, no. 6 (September 1982): 30-32.

Taylor, Robert; Rosen, Howard; and Pratzner, Frank, eds. Job Training for Youth. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1982.

Treiman, Donald J., and Hartmen, Heidi I., eds. Women, Work, and Wages: Equal Pay for Jobs of Equal Value. Washington, DC: National Academy of Sciences, National Research Council, 1981.

U.S. Department of Health, Education and Welfare. National Study of Vocational Education Systems and Facilities, Volume I. Washington, DC: U.S. Department of Health, Education and Welfare, 1978.

Weber, James M. The Role of Vocational Education in Deceasing the Dropout Rate. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1986.

Weberg, William P. "Relationships of Student Characteristics, Occupational Programs, and Program Delivery Modes on Employment and Educational Outcomes of Vocational Education Participation." Ph.D. diss., Southern Illinois University, 1984.

Weisberg, Alan. "What Research Has to Say about Vocational Education and the High Schools." Phi Delta Kappan 64, no. 5 (1983): 355-359.

Wiley, David E., and Harnischfeger, Annegret. High School Learning, Vocational Tracking, and What Then? Evanston, IL: Central Midwest Regional Education Laboratory, 1980.